RAILROAD GAZETTE

FRIDAY, SEPTEMBER 30.

Contributions.

Passing Stations at Full Speed.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I believe that on *well regulated* railway lines, it is the rule that no train, regular or extra, shall pass through a station at which another train, moving in an opposite direction, has stopped for the purpose of discharging and receiving passengers. Yet on one of our largest lines, the New York Central & Hudson River, this rule is daily violated, risking the lives of their passengers.

One morning last week, as some forty persons were about to get aboard of a down train at Irvington, some one (*not in the company's employ*) called out "Stand back!" at the same time pulling back two gentlemen who had just stepped upon the up track. He was not an instant too soon, for just as they cleared the track a single engine whirled by at a high rate of speed. So sure was the engineer that he had run over some one that he applied his brakes, with which he was fully equipped, including "driver brakes," and stopped above the station. On learning that no one was hurt, he proceeded.

It is most miraculous that a dozen persons were not killed.

One day last week the same thing occurred (*and is daily occurring*), except in place of a single engine it was the Superintendent's "Monitor" *with officials on board*. It shows either a very lax system for such a great line, or if there are any fixed rules, a very poor enforcement of the same. Since, owing to a double curve at this point, one is unable to see up or down, there should be either an electric gong, or distant signal, to be set when a train is in the station.

By giving this space in your valuable paper, you will greatly oblige an engineer and a subscriber. E. S. C.

["E. S. C." is mistaken as to its being the rule on railroads, "well regulated," or others, not to run past stations while passengers are getting on or off another train at that station. Express trains usually *do not* stop at local stations where the schedule does not call for a stop, whatever may be going on there, unless the track is actually obstructed. It is, however, the duty of the railroad company to provide against accidents in such cases, either by an arrangement of the tracks or by watching and warning in some way. We do not hear of many accidents on such occasions, but there probably is a considerable number in the aggregate, usually only one person suffering at a time, so that it does not make the impression caused by a train accident with ten to fifty victims.—EDITOR RAILROAD GAZETTE.]

The Railroad Time and Time-Instruments.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It must not be supposed that these articles will contain much which is new or important. It is their purpose to record the various methods of care and attention to correct time on several of our roads. Minor details will be given, that variety may be seen to be the ruling element here as in all things in connection with our railroads. Every road visited has a different source of time, and different method of getting and giving its corrections.

THE METHOD OF THE ERIE.

The standard clock of the Erie stands in the office of its telegraph department in New York city, and is entirely under the supervision of Professor Bull (of the University), who also supervised its construction. Once in about seven days he visits and inspects the clock; and once in about three days he takes the local time by observation, and, when necessary, corrects the clock by it.

For a short period it was the daily practice to receive by telegraph the noon signal from Washington, to compare the face of the clock with it and note any variation. The variation was, however, so small, tending as it does to correct itself, that this practice was given up as unnecessary.

The Erie noon signal to its station operators is as follows: The line is cleared of business; at one minute before twelve the New York operator begins to beat dots, one at regular intervals, until exactly the hour; then, on the hour, two together; these continued for one minute after the hour.

No report of the variation of local clocks is demanded.

OF THE CENTRAL RAILROAD OF NEW JERSEY.

The standard clock of the Central of New Jersey road is at Elizabeth, as it was made by E. Howard & Co., of Boston, and is said not to vary more than a second or two fast or slow in any one day, and is corrected only a few times in the year. The daily noon signal is received from Washington, and every variation noted.

The time signal of the road to its station operators is as follows: The operator at Elizabeth calls "32" three times as a warning signal, and at two minutes of the hour begins to beat seconds, continuing for 1¼ minutes. At ¾ of a minute to the hour, the figure "1" is made, and ½ minute thereto the figure "2," at ¼ minute the figure "3." At the exact hour two dots are written, followed by a space and other two dots. The station clocks are corrected if they are ½ minute fast or slow; otherwise the variation is merely noted.

THE NEW YORK, NEW HAVEN & HARTFORD.

The standard clocks are in New Haven, and at the door of the Superintendent's office in New York. They are corrected by adding or subtracting weight to or from the pendulum. The time is received from the observatory at Yale College, and any variation in the face of the clock noted and written upon a card which is placed below the clock's face, where it will attract attention. The running time of the road is the absolute time daily received, and conductors are expected to regulate their watches to this.

No train must follow another at a less time-distance than 10 minutes, and the passing time of the preceding train is displayed at each station in plain figures placed in a time-case.

NEW YORK CENTRAL & HUDSON RIVER.

The time service of this company involves the use of apparatus, which must be described in detail.

Mr. James Hamblet, who has charge of the New York connections of the time-ball service, and of the Western Union Telegraph Company's time, is the inventor of a clock, which performs the following service on connecting instruments, one of which is in the New York Central's telegraph office at the Grand Central depot:

It beats every two seconds, but with the following pauses and intervals:

1. It pauses one beat (interval of 4 seconds) immediately before the beginning of each minute.

2. It pauses nine beats (interval of 20 seconds) immediately before the beginning of each fifth minute.

3. At the beginning of each hour and quarter, the instrument strikes (with increased power) like an ordinary clock; the hour being repeated before each quarter, and the quarters indicated by one, two and three beats respectively.

This clock keeps Western Union Telegraph time, which is a mean of the observed time of Washington, Cambridge (Mass.), and Allegheny (Pa.), observations. The method of comparison will be referred to farther on.

The correcting instrument (of this clock) in the office of the New York Central gives the dispatcher at all hours of the day a time which, in comparison with all practical needs, is an ideal time.

He does not therefore wait for the noon signal, but divides his numerous time-duties into three portions.

At 10 o'clock a. m. he corrects the electrically controlled clocks in the Hudson River Railroad, and the Harlem Railroad (New York) depots and the electrically controlled clocks of the Grand Central Depot yard and of its lookout.

At 11 a. m. he corrects the electrically controlled clocks on the Hudson River Railroad, and gives the time signal to Poughkeepsie station.

At 12 (noon) he gives the time signal to the Harlem road, and corrects the electrically controlled clock at Dover Plains. Albany depot telegraph station also receives this signal, and transmits it along the line of the New York Central as far as Buffalo.

A few words about the electric apparatus of the station clocks referred to will be necessary before giving the Central's method of time signal.

This apparatus is the invention of Mr. P. H. Dudley, who has been, we believe, the first to apply electric control to the second as well as the minute hand of clocks. The correction is made by means of the attraction of an armature to an electro-magnet. The apparatus is worked by the power of the local battery. A three-point switch connects the clock, the sounder and the wire to the relay; a few minutes before correction-time, the sounder is switched out of the circuit and the clock switched in, and the correction made by the signal from the central office.

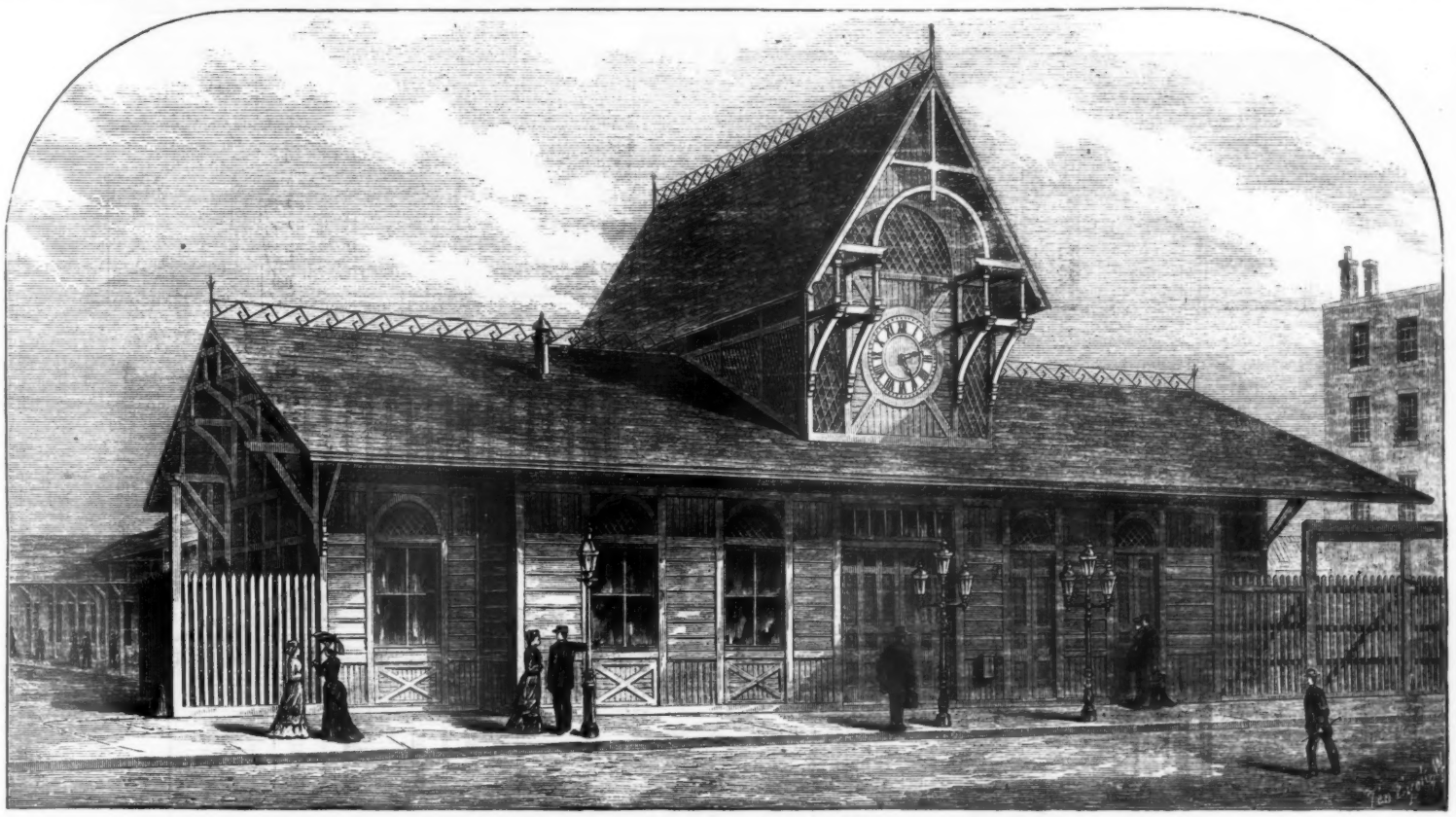
The clocks are placed as follows: In the Grand Central Depot, its yard and yard lookout.

In the stations at New York, Yonkers, Tarrytown, Sing Sing, Peekskill, Garrison's, Fishkill, Poughkeepsie, Tivoli, Hudson, East Albany and at Dover Plains.

The time signal from the central office is begun at 1½ minutes of the hour by writing the "time" for ½ minute and then by beating the seconds. Each second is beat until the fiftieth, when the word "switch" is written as a signal to switch the station sounders out and the station clocks into circuit; and then precisely at the hour the correcting signal is given, the correction of all clocks following automatically.

The amount of each local correction is then reported to the central office by the station agent.

The operator of the yard Lookout in the tower of the



NEW YORK & NEW ENGLAND PASSENGER STATION IN BOSTON.

Grand Central Depot (the correction of whose clock has been described above) controls and corrects electrically controlled clocks in the signal stations at Eighty-eighth street and at Mott Haven Junction. Between these points and the depot lies (at Fifty-third street) a cross-over for out-going and incoming trains, and previous to the introduction of this system of controlled clocks there had been (very infrequent) delays here; variation of time between these signal stations and the lookout causing the blocking of the cross-over to an incoming train.

THE VARIATION IN TIME-MEASURING INSTRUMENTS.

The reported daily variation in the Hudson River Railroad station clocks is from one to twenty seconds, the rule being that nearly all the clocks will be on time (variation not perceived) with one or two exceptions; but these exceptions are made up by diverse clocks, to-day Garrison's being 2 seconds fast, to-morrow Sing Sing's 20 seconds fast, etc.

These are, of course, superior clocks compared with those in ordinary use. There would be something more than interest in knowing what is the daily variation of the ordinary station clocks on an average railroad. On one of our best roads, I am told, the variation on an experimental telegraphic inquiry proved to be from one to one and one-half minutes, which would mean that a train running at 50 miles per hour, and reported as having passed the station, would at that (standard) time be one mile or more away.*

The best standard clocks which have been carefully regulated to their local conditions may not show a daily variation of more than two or three seconds, and may not ordinarily exceed one second's variation in any twenty-four hours. No clock, however, is beyond the possibility of an accidental variation of even a dangerous extent. In the matter of time eternal vigilance is necessary, not to regulate the mechanical mechanism merely but still more to keep the human mechanism of time-attention in perfect order.

The following is a comparison of observatory time for five days:

Washington.	Cambridge.	Allegheny.
$\frac{13}{100}$ of a sec. slow.		
$\frac{82}{100}$ of a sec. fast.	$\frac{1}{100}$ of a sec. slow.	$\frac{19}{100}$ of a sec. fast.
$\frac{21}{100}$ of a sec. fast.	$\frac{14}{100}$ of a sec. slow.	$\frac{42}{100}$ of a sec. fast.
$\frac{2}{100}$ of a sec. fast.	$\frac{44}{100}$ of a sec. slow.	$\frac{28}{100}$ of a sec. fast.
$\frac{14}{100}$ of a sec. fast.	$\frac{3}{100}$ of a sec. slow.	$\frac{7}{100}$ of a sec. fast.

*After a study of the question, the writer is prepared to make the following assertions: First, that the maximum variation of *some* of the station clocks on the average railroad is *at least* three (3) minutes; second, that the ordinary maximum variation of some of its clocks is *at least* one or one and one-half (1½) minutes; third, that a common and uniform variation is at least one-half (½) minute. These variations are asserted as compared with standard time; the absolute difference of some station clocks on the average road may safely be asserted to be twice the above quantities. These assertions are not made as true of any one road, but of an average representative of the entire number.

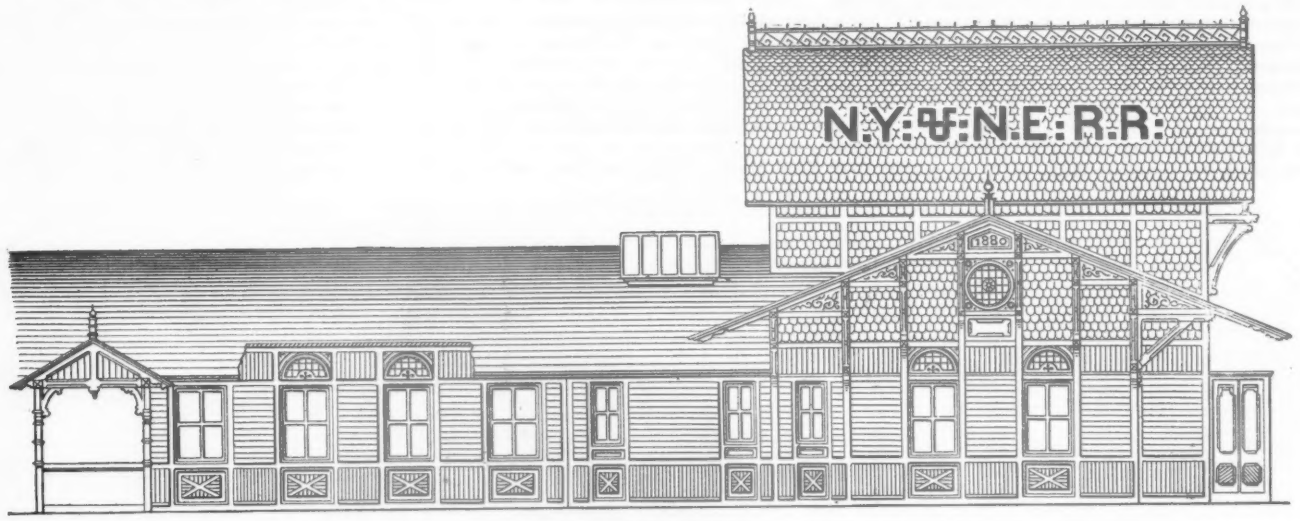
This comparison of observations is made in New York with his standard clock by Mr. Hamblet, of the Western Union line service, who sends once a month to each observatory a full sheet of the daily received reports from all.

The comparisons is made graphically. Mr. Hamblet's clock of which we have spoken, records its seconds not only by the beats of correcting instruments, but also by indentations upon the tape of a chronograph placed in the gallery above the "switch" of the Western Union operating room.

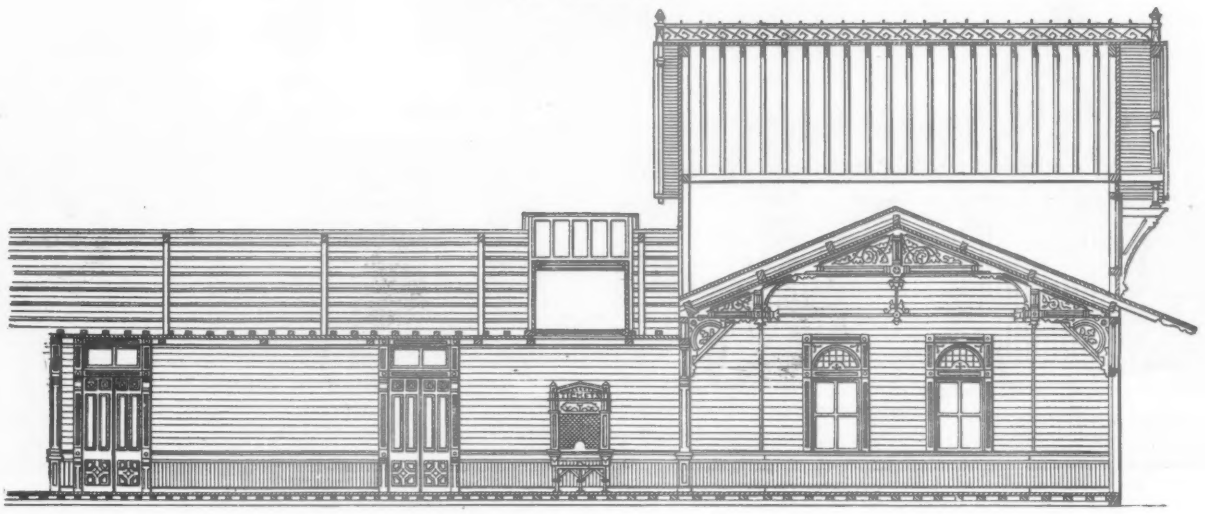
The indentations are about one inch apart; and one minute before noon a similar series is received from the clock in the Washington Observatory, and the two records of graphic seconds compared by a glass gauge which has its inches divided into twentieths; it is possible, therefore, to measure by it $\frac{5}{100}$ of a graphic second.

The comparison of seconds with the time of the two other observatories is made about five in the afternoon, after the hurry of business is over.

The variation in the time-ball's descent is from $\frac{3}{100}$ to ¼ or ¼ a second. The record for six days is as follows: $\frac{8}{100}$ of a second, $\frac{2}{100}$, $\frac{4}{100}$, $\frac{37}{100}$, $\frac{3}{100}$, $\frac{7}{100}$, all fast. Occasionally it is exact.



SIDE ELEVATION.



LONGITUDINAL SECTION.

NEW YORK & NEW ENGLAND PASSENGER STATION IN BOSTON.

Boston Station of the New York & New England Railroad.

The accompanying engravings represent a perspective view, a front elevation, a side elevation, a section through the hall and a plan of the new passenger station of the New York & New England Railroad at Boston.

Before the construction of this station they occupied a building 60 × 415 ft., half of which was used for freight and half for passenger accommodations; 102 ft. of the front of this building was torn down and the present station erected, it being joined on to the remainder (313 ft.), which is used for the train house. Most of the timber taken from the old building was used in the frame of the new one. The inside is sheathed with yellow pine, the brackets, doors and other portions being finished with the same wood. The ticket, news, telegraph, dining and closet rooms are heated by steam; the waiting rooms by stoves. The building is covered with galvanized iron, resin-sized paper and hemlock boards. The roof is laid with slate. The ground plan shows the arrangement and sizes of the rooms, which were changed from the original plan.

Train Accidents in August.

The following accidents are included in our record for the month of August:

REAR COLLISIONS.

On the 1st a freight train on the New York, Pennsylvania & Ohio road broke in two near Evansburg, Pa., and the rear section ran into the forward one, wrecking several cars.

On the afternoon of the 1st a freight train on the Pennsylvania Railroad ran into the rear of a preceding freight near Lancaster, Pa., wrecking several cars, injuring the engineer and fireman. There was a thunder storm raging at the time.

On the evening of the 1st a freight train on the New York, Lake Erie & Western road ran into the rear of a local freight which was stopping at Great Valley, N. Y., wrecking the caboose and eight cars, damaging the engine and tearing up the station platform.

On the morning of the 3d a freight train on the Texas & Pacific road ran into the rear of a passenger train which had stopped for some cause near Kildare, Tex. A car was damaged and five passengers slightly hurt.

On the afternoon of the 4th a freight train on the Baltimore & Ohio ran into the rear of another freight which had stopped at Roseby's Rock, W. Va. The engine and several cars were wrecked, the engineer hurt.

On the 5th a freight train on the Ohio & Mississippi road ran into the rear of a preceding freight near Vincennes, Ind., wrecking the caboose and killing one man.

On the evening of the 6th a Troy & Boston passenger train ran past the depot in North Adams, Mass., and into the Fitchburg Railroad engine, which was waiting to take the train on. Both engines were badly damaged.

On the afternoon of the 6th a wild engine on the New York, Ontario & Western road ran into the rear of a passenger train at Summitville, N. Y. The passenger train had stopped to switch a car, but had sent out no signal.

On the afternoon of the 8th the engine of a freight train on the Pittsburgh, Ft. Wayne & Chicago road broke down on a grade in Allegheny, Pa., and the train ran back down the grade and into another freight train standing at the depot, wrecking the tender and several cars.

On the afternoon of the 10th a freight train on the Pennsylvania Railroad ran into a preceding freight near Hawkins, Pa., wrecking a car.

On the 12th a special passenger train carrying soldiers on the Denver & Rio Grande road broke in two near Marshall Pass, Col., and the rear section ran into the forward one, wrecking two cars, killing one man and injuring another.

On the evening of the 16th a freight train on the Cleveland, Mt. Vernon & Delaware road ran into a preceding freight, which had stopped at Millersburg, O., wrecking several cars.

On the night of the 16th a wild engine on the Atchison, Topeka & Santa Fe road ran into the rear of a freight train near Emporia, Kan., damaging three cars.

On the morning of the 17th a freight train on the Baltimore & Ohio road ran into the rear of a preceding freight near Salesville, O., wrecking several cars.

A signal was sent back to stop a third section, but too late, and it ran into the wreck, piling up a number of cars on the engine and making a very bad wreck, which blocked the road all day.

On the night of the 17th a freight train on the Missouri Pacific ran into a preceding freight near Chamois, Mo., throwing several cars down a bank into the river.

On the morning of the 18th a freight train on the Troy & Greenfield road ran into the rear of another freight, which had stopped at West Deerfield, Mass. The engine and two cars were damaged.

On the morning of the 19th a Boston & Albany freight train ran into the rear of an Eastern coal train near Chelsea, Mass., on the Eastern track.

On the morning of the 20th a coal train on the Pennsylvania Railroad ran into the rear of another coal train standing on a trestle at South Amboy, N. J., wrecking a number of cars.

On the 20th a freight train on the Chicago, Milwaukee & St. Paul road broke in two near Elgin, Ill., and the rear section ran into the forward one, breaking several cars badly.

On the morning of the 23d a freight train on the Ohio Southern road ran into a passenger train on a siding at Bainbridge, O., wrecking an engine and several cars, killing a fireman and a passenger.

On the afternoon of the 23d a freight train on the Baltimore & Ohio road ran into the rear of a repair train near Summit, O., damaging the engine and caboose, killing one laborer and injuring a fireman.

On the afternoon of the 23d a switching freight train of the Indianapolis & St. Louis road ran into an Indianapolis, Decatur & Springfield yard engine in Indianapolis, Ind., doing some damage.

Very early on the morning of the 24th a freight train on the Detroit, Lansing & Northern road ran into a preceding freight near Portland, Mich., and the engine and several cars were badly damaged.

On the afternoon of the 24th a long excursion train with two engines on the New Haven & Northampton road ran into the rear of a freight train which had hauled into a siding at Hitchcock's, Conn., still leaving several cars on the main track. One engine and five freight cars were badly broken up, the second engine damaged and an engineer and fireman hurt.

On the morning of the 25th a freight train on the New York, Pennsylvania & Ohio road ran into the rear of a preceding freight which had stopped at Corry, Pa., wrecking several cars. There was a thick fog at the time.

On the afternoon of the 25th a freight train on the Kansas City, St. Joseph & Council Bluffs road ran into the rear of a repair train near Wright, Ia., damaging several cars.

On the morning of the 26th a freight train on the Lake Shore & Michigan Southern road ran into some cars which had broken loose from a preceding freight near Elmore, O., wrecking three cars.

About noon on the 26th a freight train on the Illinois Central road ran over a misplaced switch and into a freight train on a siding in Chicago, Ill. The engines and several cars were badly damaged.

On the afternoon of the 26th a passenger train on the New York, Lake Erie & Western road ran into the rear of a freight in Binghamton, N. Y., wrecking three cars.

On the night of the 26th a freight train on the New York, Lake Erie & Western road ran over a misplaced switch and into a yard engine standing on a siding in Port Jervis, N. Y. Both engines were damaged.

Very early on the morning of the 27th a freight train on the New York, Lake Erie & Western road ran into the rear of a preceding freight near Middletown, N. Y., damaging several cars.

On the morning of the 27th a passenger train on the New York, Lake Erie & Western road ran into a yard engine standing on the track in Middletown, N. Y., doing some damage.

On the 27th a freight train on the Grand Trunk road ran into the rear of a passenger train at the Grand River bridge, near Breslau, Ont., doing some damage.

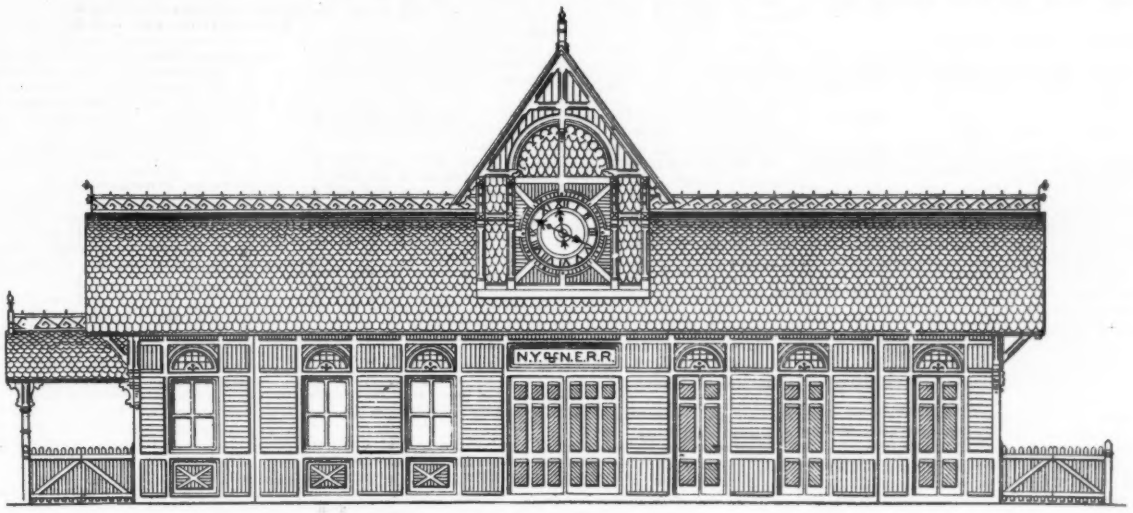
Very early on the morning of the 28th a freight train on the Alabama Central road ran over a misplaced switch and into a construction train standing on a siding at Faunsdale, Ala. The engine and several construction cars were wrecked, the engineer and fireman killed.

On the evening of the 28th a passenger train on the Pennsylvania Railroad ran into the rear of a preceding passenger train, which had stopped at Merion, Pa. One car was wrecked, two others damaged, and two passengers hurt. It is said that the operator at Merion neglected to block the second train.

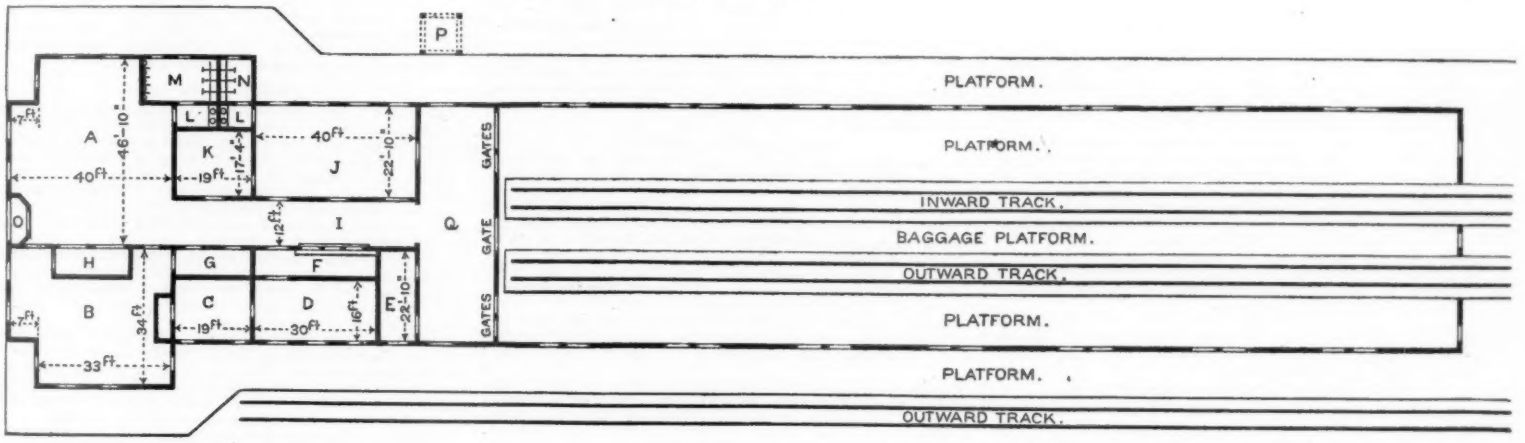
On the evening of the 28th a freight train on the Grand Trunk road ran into another freight which was just going into a siding at Ailsa Craig, Ont., damaging several cars.

On the morning of the 29th a freight train on the Minneapolis & St. Louis road backed into another freight which was standing on the track at Vernon, Ia., wrecking both cabooses and injuring three passengers.

On the morning of the 29th a construction train on the Connecticut & Passumpsic Rivers Road ran into the rear of a passenger train which had stopped at North Hatley, P. Q. The engine and one passenger car were badly broken.



FRONT ELEVATION.



A, General Waiting Room,
B, Baggage Room.
C, Kitchen.
D, Dining Room.
E, Depot-Master's Room.
F, Refreshment Room.
G, Telegraph Office and Package Room.
H, News Stand.
I, Hall.
J, Ladies' Room.
K, Ticket Office.
L, Lavatories.
M, Gentlemen's Water-closet.
N, Ladies' " "
O, Vestibule.
P, Porte-cochere.
Q, Train House.

NEW YORK & NEW ENGLAND PASSENGER STATION IN BOSTON.

On the night of the 30th a freight train on the Pennsylvania Railroad broke in two near Braddock's, Pa., and the rear section ran into the forward one, wrecking several cars.

On the night of the 30th a freight train on the Pennsylvania Railroad ran into three cars which had been left standing on the track in Pittsburgh, Pa. The cars were wrecked and the engine damaged.

On the night of the 31st a freight train on the New York, Lake Erie & Western road backed into another freight on a siding at Lordville, N. Y., piling up six cars in a bad wreck.

BUTTING COLLISIONS.

On the morning of the 1st there was a butting collision between two freight trains on the Missouri, Kansas & Texas road near Caney, Ind. Ter. Both engines were badly broken and several cars damaged.

Very early on the morning of the 4th there was a butting collision between two freight trains on the Atchison, Topeka & Santa Fe road near Topeka, Kan. Both engines were wrecked and 11 cars damaged. The accident was caused by the men on one train mistaking their orders to meet at Topeka.

On the afternoon of the 5th a freight train on the Chicago, Milwaukee & St. Paul road ran into the head of a repair train near Dubuque, Ia., wrecking both engines and several cars and injuring five laborers.

Very early on the morning of the 12th there was a butting collision between a passenger train and a wild engine on the Central Pacific road near Ogden, Utah. Both engines were damaged.

On the night of the 13th there was a butting collision between two freight trains on the Louisville, Cincinnati & Lexington road near Campbellsburg, Ky., by which both engines were damaged, a fireman killed and two other trainmen hurt.

Very early on the morning of the 15th there was a butting collision between two freight trains on the Pittsburgh, Ft. Wayne & Chicago road near Wooster, O., by which both engines and several cars were piled up in a bad wreck. A brakeman was killed and a fireman hurt. The collision is said to have been caused by a dispatcher's mistake.

On the morning of the 16th there was a butting collision between a passenger and a freight train on the St. John & Maine road near Fairville, N. B. Both engines were wrecked, several cars damaged, a fireman fatally and an engineer severely hurt and five others bruised. The trains had orders to meet at Fairville, but the passenger train disregarded them.

On the night of the 16th there was a butting collision between a passenger and a coal train on the Ohio Central road near Rushville, O. Both engines were damaged.

On the afternoon of the 23d there was a butting collision between two shifting trains in the yard in Pittsburgh, Pa., on the Pennsylvania road.

On the 23d there was a butting collision between two passenger trains near McArthurs, O., on the Ohio & West Virginia road.

On the night of the 23d there was a butting collision between two freight trains on the Richmond, Fredericksburg & Potomac road near North Anna Bridge, Va. Both engines and several cars were wrecked, an engineer and a fireman hurt and the road blocked all night.

On the 25th there was a butting collision between two freight trains on the Scioto Valley road near Piketon, O., wrecking both engines and several cars.

On the morning of the 27th there was a butting collision between two freight trains on the Missouri, Kansas & Texas road near Eufaula, Ind. Ter., by which both engines and several cars were wrecked.

On the 28th there was a butting collision between two freight trains on the Grand Trunk road near Lancaster, P. Q., by which both engines and several cars were wrecked, three trainmen killed, one fatally hurt and one badly hurt. The accident is said to have been caused by failure of an operator to give an order properly.

On the 28th there was a butting collision between two freight trains on the Milwaukee, Lake Shore & Western road near Wausau, Wis., by which both engines and several cars were wrecked, an engineer, a fireman and a brakeman killed.

Very early on the morning of the 29th there was a butting collision between two freight trains on the New York, Lake Erie & Western road near Cuba Summit, N. Y. Both engines were almost destroyed and 40 cars were piled up in a very bad wreck. An engineer and a brakeman were killed, a fireman hurt. It is said that one of the trains disobeyed orders to wait for the other.

On the evening of the 29th there was a butting collision between two freight trains on the Lake Erie & Western road near Templeton, Ind., by which both engines and several cars were badly broken. It is said to have been caused by a dispatcher's mistake.

On the night of the 29th there was a butting collision between a passenger and a freight train on the Indianapolis & St. Louis road near Long Lake, Ill. Both engines and several freight cars were damaged. It is said that the freight was running against orders.

On the evening of the 30th six cars broke loose from a coal train on the New York Central & Hudson River Road in Buffalo, N. Y., and ran back down grade and into the head of a following freight. The cars were wrecked and an engine damaged.

On the night of the 31st there was a butting collision between a passenger and a freight train on the Chicago,

Milwaukee & St. Paul Road near La Crosse, Wis., by which both engines and several cars were damaged and the road blocked all night.

CROSSING COLLISIONS.

On the night of the 16th an Atchison, Topeka & Sant Fe freight ran into a Missouri, Kansas & Texas passenger train at the crossing of the two roads in Emporia, Kan., upsetting two cars and damaging them badly.

Near midnight on the 24th there was a collision between a Lake Shore & Michigan Southern and a Chicago & Grand Trunk freight at the crossing at Sixteenth street in Chicago.

On the afternoon of the 29th a New York Central & Hudson River passenger train ran into a New York, Lake Erie & Western freight at the crossing in Tonawanda, N. Y., and both engines were badly broken.

DERAILMENTS, BROKEN RAIL.

On the morning of the 5th three cars of a passenger train on the Western Oregon road were thrown from the track near Hillsboro, Or., by a broken rail.

On the 20th a passenger train on the Atlantic, Gulf & West India Transit road was thrown from the track near Callahan, Fla., by a broken rail.

On the 28th a freight train on the Chicago & Grand Trunk road was thrown from the track near Battle Creek, Mich., by a broken rail. Nine cars were wrecked and a brakeman killed.

DERAILMENT, BROKEN WHEEL.

On the afternoon of the 16th two cars of a passenger train on the Chicago, St. Paul, Minneapolis & Omaha road were thrown from the track in St. Paul, Minn., by a broken wheel.

DERAILMENT, LOOSE WHEEL.

On the 30th two cars of a freight train on the New York Central & Hudson River road were thrown from the track near Geneva, N. Y., by a loose wheel.

DERAILMENTS, BROKEN AXLE.

On the morning of the 15th a car of a freight train on the Cleveland & Pittsburgh road was thrown from the track near Toronto, O., by a broken axle.

On the 29th several cars of a freight train on the Chicago & Alton road were thrown from the track near Edwardsville Junction, Ill., by a broken axle.

DERAILMENTS, BROKEN BRIDGE.

On the morning of the 5th a freight train on the Missouri Pacific road broke through a small bridge near Oak Mills, Kan., and eight cars went down into Walnut Creek, injuring a tramp, who was stealing a ride.

Early on the morning of the 27th a freight train on the Chicago, Burlington & Quincy road broke through a bridge near Albia, Ia., and the cars were piled up in a bad wreck below. The wreck caught fire and several cars were burned up. A brakeman was fatally hurt.

On the morning of the 31st a freight train on the Detroit, Lansing & Northern road broke through a bridge near Fenwick, Mich., which was on fire and partly burned through, and 18 cars were piled up in a ravine below. A brakeman was killed.

DERAILMENT, SPREADING OF RAILS.

On the evening of the 6th seven cars of a freight train on the New York, Lake Erie & Western road were thrown from the track in Port Jervis, N. Y., by the spreading of the rails.

DERAILMENTS, WASH-OUT.

On the morning of the 3d a passenger train on the New Orleans Division of the Louisville & Nashville road ran into a wash-out near Webb's Landing, Ala. Two cars were upset and two passengers slightly hurt.

On the afternoon of the 6th a passenger train on the Cleveland, Mt. Vernon & Delaware road ran into a wash-out near Howard, O., and two cars were wrecked.

On the night of the 12th an emigrant train on the Atchison, Topeka & Santa Fe road ran into a wash-out near Las Vegas, N. M., and the engine and several cars were wrecked, killing the engineer and fireman.

Early in the month a freight train on the St. Johns, Lake Eustis & Gulf road ran into a wash-out near Ft. Mason, Fla., damaging the engine and two cars, injuring the engineer and fireman slightly.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the morning of the 5th a freight train on the Boston & Lowell road was thrown from the track in North Cambridge, Mass., by a tie which fell from a flat car on the rails.

On the afternoon of the 5th some telegraph poles, carelessly loaded on a flat car in a freight train which had gone into a siding at Grade 29, Tenn., on the Nashville, Chattanooga & St. Louis road, projected over the main track, striking the engine and baggage car, striking and upsetting a passenger car. One passenger was hurt so that he died the same day. Another passenger, a brakeman and the engineer were also hurt.

On the night of the 6th a passenger train on the Baltimore & Ohio road struck a rock which had rolled on the track near Moorhead's Mill, Pa., and the engine was thrown from the track.

On the morning of the 19th a passenger train on the Eastern road ran into a push car loaded with rails, which some trackmen had left standing near Malden Centre, Mass. The engine was thrown from the track and badly damaged.

About noon on the 24th a car of a freight train on the Pennsylvania Railroad was thrown from the track and upset near Littlestown, Pa., by a drawhead which pulled out and fell on the track.

Near midnight on the 30th six cars of a freight train on the Central Railroad, of New Jersey, were thrown from the track in Plainfield, N. J., by a large log which rolled off a flat car.

DERAILMENTS, CATTLE.

On the afternoon of the 7th a passenger train on the Indianapolis & St. Louis road ran over a cow near Charleston, Ill., and the engine was thrown from the track, injuring one man slightly.

Very early on the morning of the 13th a passenger train on the Grand Trunk road ran over a cow near Brockville, Ont., and the engine and two cars were thrown from the track and down a bank, the engine one side of the track, the cars the other. The engineer was killed, the fireman, baggageman and two passengers hurt.

On the morning of the 18th a freight train on the Marietta & Cincinnati road ran over a cow near Summit Switch, O., and the engine was thrown from the track, killing the engineer and injuring the fireman.

On the morning of the 22d a passenger train on the Denver & Rio Grande road ran over a cow near Cañon City, Col., and the engine and baggage car were thrown from the track, injuring the engineer and fireman.

On the evening of the 24th a coal train on the Philadelphia & Reading road ran over a cow near Locust Gap, Pa., and several cars were thrown from the track.

On the night of the 24th a freight train on the Chicago, Burlington & Quincy road struck a horse on the track near Twenty-seventh street in Chicago, Ill. The engine and five cars went into the ditch and were wrecked, killing a brakeman.

DERAILMENTS, MISPLACED SWITCH.

On the evening of the 8th the engine of a passenger train on the Philadelphia & Atlantic City road was thrown from the track at Hammonton, N. J., by a misplaced switch.

On the evening of the 14th the engine and four cars of a freight train on the Buffalo Creek road was thrown from the track in Buffalo, N. Y., by a misplaced switch.

On the night of the 14th the engine and seven cars of a freight train on the Naugatuck road were thrown from the track in Ansonia, Conn., by a misplaced switch. The engine upset and was damaged. A brakeman was slightly hurt.

On the night of the 16th a freight train on the Lake Shore & Michigan Southern road was thrown from the track by a misplaced switch at Butler Crossing, Mich., and the engine and 12 cars were piled up in a bad wreck.

On the night of the 16th a passenger train on the St. Paul, Minneapolis & Manitoba road was thrown from the track in East Minneapolis, Minn., by a misplaced switch.

On the morning of the 21st the engine and several cars of a freight train on the Cincinnati, Indianapolis, St. Louis & Chicago road were thrown from the track in Indianapolis, Ind., by a misplaced switch.

On the morning of the 24th a freight train on the Lake Shore & Michigan Southern road was thrown from the track at Millbury, O., by a misplaced switch.

On the evening of the 26th a gravel train on the Boston, Hoosac Tunnel & Western road was thrown from the track at Blackinton, Mass., by a misplaced switch, blocking the road two hours.

On the evening of the 27th a car of a passenger train on the Raleigh & Augusta Air Line was thrown from the track in Raleigh, N. C., by a misplaced switch.

On the 28th a freight train on the New York Central & Hudson River was thrown from the track in Lockport, N. Y., by a misplaced switch. Six cars were wrecked and a brakeman hurt.

On the afternoon of the 29th the engine of an ore train on the Chicago & Northwestern road was thrown from the track in Negaunee, Mich., by a misplaced switch. The train consisted of 64 loaded cars and was on a down grade, and the sudden stop caused the cars to pile up on each other until 40 cars were badly wrecked, the wreck being piled up on the depot platform. Two brakemen were hurt.

MALICIOUS DERAILMENTS.

On the night of the 6th a freight train on the New York, Lake Erie & Western road was thrown from the track at Swaims, N. Y., by a switch which had been purposely misplaced, it is believed, for the purpose of wrecking a passenger train then nearly due.

Very early on the morning of the 13th a freight train on the New Orleans Division of the Louisville & Nashville road was thrown from the track at Grand Bay, Ala., by a block of wood which had been driven in beside a switch rail. A discharged hand was arrested on a charge of placing the obstruction.

On the night of the 20th a coal train on the Lehigh Valley road was thrown from the track near Whitehall, Pa., by obstructions placed on the track by some persons unknown. The engine and a number of cars were wrecked.

Near midnight on the 30th both engines of a passenger train on the Central Pacific road were thrown from the track at Cape Horn Mills, Cal., by obstructions placed on the track. Several men attempted to rob the train, but were frightened off.

UNEXPLAINED DERAILMENTS.

On the morning of the 1st a freight train on the Long Island road ran off the track at Babylon, N. Y., and two cars were wrecked.

On the morning of the 2d a car of a freight on the Pennsylvania Railroad ran off the track on the elevated road in Philadelphia, and several cars went off, knocking down a corner of a building.

On the afternoon of the 3d a freight train on the New York Central & Hudson River road ran off the track near Bergen, N. Y., and 12 cars ran into the ditch.

On the afternoon of the 3d a car of a freight train on the Pennsylvania Railroad ran off the track in East Newark, N. J., knocking down a small house which stood by the track.

On the afternoon of the 4th three cars of a freight train on the Chicago, Milwaukee & St. Paul road ran off the track at Lyons, Ia., at the northwestern crossing, blocking both roads.

On the afternoon of the 5th a freight train on the Missouri Pacific road ran off the track near Leavenworth, Kan., doing some damage.

On the afternoon of the 5th a passenger train on the Toledo, Delphos & Burlington road ran off the track near Kokomo, Ind., and the engine and baggage car upset and were wrecked, injuring three trainmen badly.

On the evening of the 6th a freight train on the Grand Trunk road ran off the track close to a bridge near Brompton, Ont., and the engine and several cars went over the bridge and were wrecked.

On the morning of the 9th a freight train on the New York, Lake Erie & Western road ran off the track in Binghamton, N. Y., and the engine upset.

On the 9th a freight train on the Chicago, Burlington & Quincy road ran off the track near Mt. Pleasant, Ia., and the fireman was fatally hurt.

On the morning of the 13th a car of a freight train on the Louisville & Nashville road ran off the track near Baker's Hill, Ky., blocking the road an hour.

On the night of the 14th six cars of a freight train ran off the track on a trestle in Nashville, Tenn., on the Louisville & Nashville road.

Early on the morning of the 17th several cars of a freight train on the New York, New Haven & Hartford road ran off the track in Bridgeport, Conn., blocking the road two hours.

On the morning of the 18th a passenger train on the Texas & St. Louis road ran off the track near Waco, Tex., the engine upset down a bank and two cars were wrecked. Two passengers were killed, another passenger, the engineer and the fireman hurt.

On the morning of the 18th a car of a freight train ran off the track in Indianapolis, Ind., on the Union tracks.

On the afternoon of the 18th the engine of a passenger train on the Troy & Greenfield road ran off the track at Zoar, Mass., blocking the road some time.

On the evening of the 18th a freight train on the New York Central & Hudson River Road ran off the track near Grimesville, N. Y., blocking the road two hours.

On the morning of the 21st eight cars of a freight train on the Jeffersonville, Madison & Indianapolis road ran off the track at Whiteland, Ind., and were badly wrecked.

BOILER EXPLOSION.

On the evening of the 21st the engine of a passenger train on the Chicago, Milwaukee & St. Paul road exploded its boiler near Farley, Ia. The engine was wrecked, the engineer killed, and four others injured.

OTHER ACCIDENTS.

On the afternoon of the 19th a passenger train on the New Haven & Northampton road broke a wheel under the tender near Westfield, Mass., delaying the train an hour.

On the evening of the 22d the engine of a passenger train on the Albany & Susquehanna road broke a parallel rod when near New Scotland, N. Y., tearing up one side of the engine.

On the morning of the 30th a parallel rod broke on the engine of a passenger train on the New York, Lake Erie & Western road near Rochester, N. Y., damaging the engine badly.

This is a total of 129 accidents, whereby 31 persons were killed and 67 injured. Twenty-one accidents caused the death of one or more persons; 19 caused injury, but not death, leaving no less than 89, or 69 per cent. of the whole number, in which no serious injury is recorded.

The record shows for the eight months of this year to Aug. 31 a total of 937 accidents, 241 killed and 977 injured; a monthly average of 117 accidents, 30 killed and 122 injured. This monthly average was much greater than in the previous year.

Association of American Railroad Superintendents.

The second meeting of the Association of American Railroad Superintendents was held at the Windsor Hotel, New York, on Wednesday and Thursday, Sept. 21 and 22.

The following-named gentlemen were present:

Waterman Stone, Prov., Warren & Bristol.
L. W. Sandiforth, Danbury & Norwalk.
C. D. Hammond, Albany & Susquehanna.
J. F. Devine, Wil. & Weldon and Wil., C. & Augusta.
C. W. Chapman, Catasauqua & Fogelsville.
J. H. Franklin, Boston & New York Air Line.
Peyton Randolph, Virginia Midland.
J. D. Kline, Richmond & Petersburg.
R. M. Sully, Petersburg R. R.
N. M. Osborne, Norfolk & Western.
J. W. Fry, Columbia & Greenville.
E. G. Ghio, Seaboard & Roanoke.
T. M. R. Talcott, Richmond & Danville.
G. R. Talcott, Charlotte, Columbia & Augusta.
J. M. Metheany, Grand Rapids & Indiana.
P. S. O'Rourke, Grand Rapids & Indiana.
Sanford Keeler, Flint & Pere Marquette.
R. S. Walker, Richmond & Allegheny.
C. L. Kimball, Newburg, Dutchess & Connecticut.

The meeting was called to order and temporarily organized by the election of Peyton Randolph as Chairman and Waterman Stone as Secretary.

The records of the last meeting were read and approved.

The committee appointed at the last meeting presented a constitution and by-laws for the consideration of the meeting. This report was received and the committee discharged.

The Association then adopted the following constitution and by-laws:

PREAMBLE.

For mutual improvement, increase of social intercourse and more frequent and general interchange of views, we hereby form an organization to be known as "The Association of American Railroad Superintendents;" and establish the following constitution for its government:

CONSTITUTION.

ARTICLE 1.—Any general superintendent, division superintendent, or assistant superintendent of an American steam railroad, or person filling an equivalent position, may be admitted a member of this Association by a two-thirds vote of the members present at any regular or special meeting.

ARTICLE 2.—Past superintendents may be elected honorary members by a two-thirds vote of the members present at any regular meeting, notice of such intended election having been given at the previous meeting.

ARTICLE 3.—Meetings shall be held semi-annually at such times and places as may be fixed by the by-laws; and special meetings may be called whenever a majority of the officers of the Association shall deem them necessary, and in such places as they may designate.

ARTICLE 4.—The officers of the Association shall be a President, First, Second and Third Vice-President, Secretary, Assistant Secretary and Treasurer; all of whom shall be elected by ballot annually, and each must have a majority of all the votes cast. In case of failure to elect, the old officers shall hold over until their successors are elected.

ARTICLE 5.—The President shall preside at all meetings of the Association. In the absence of the President, the Vice-Presidents, who may be present, shall preside in the order of their seniority. In the absence of the President and Vice-Presidents, the Secretary, and in his absence the Assistant Secretary shall call the meeting to order, and the members present shall elect, *viva voce*, a presiding officer, who shall serve until the President or one of the Vice-Presidents shall arrive.

The Secretary shall keep a record of the doings of the Association, have charge of all papers, books and documents belonging to the same, and shall call all meetings, in accordance with the by-laws. In case of the absence or death of the Secretary the Assistant Secretary shall perform the duties prescribed.

The Treasurer shall collect all assessments and pay all bills against the Association which have been approved by the President.

ARTICLE 6.—There shall be an annual assessment upon each member as may be provided for by the by-laws, and the first payment shall be due when he is admitted into the Association.

No assessment beyond this shall be made except by a vote of two-thirds of the members present at any regularly called meeting of the Association.

ARTICLE 7.—This constitution may be amended by a vote of two-thirds of the members present at any regularly called meeting of the Association, notice of such intended amendment having been given at the previous meeting, and also in the call for the meeting at which the amendment is to be acted upon.

BY-LAWS.

1. Meetings of the Association shall be held on the third Wednesday in April and October, at 10 o'clock a. m.

2. The order of business at all meetings shall be as follows:

a. Records of last meeting to be read.
b. Honorary or other members proposed.
c. Communications received since last meeting to be reported and read, if desired by any member.
d. Reports from committees.
e. Unfinished business.
f. New subjects in the order they stand in the call for the meeting, unless changed by a majority of the members present.

3. Parliamentary rules shall govern all meetings of the Association.

4. The Secretary shall send notice of all meetings to each member by mail, at least 30 days before the day of the

meeting, and shall state in the same the subjects to be acted upon, so far as the same may be known to him.

5. Members who have subjects for consideration, or desire action of the Association, or who may have communications to make, shall inform the Secretary of the same, at least six weeks before each regular meeting, in order that he may draw attention thereto in the call for the meeting.

6. Ten members shall constitue a quorum.

7. All meetings shall be called to order within 30 minutes of the time appointed.

8. All reports or propositions upon which action is desired shall be divided into sections as far as may be, and the sections shall be numbered, and all such reports and propositions shall be in writing.

9. No reports presented for action shall be rejected as a whole, unless by the unanimous wishes of the Association, or unless its several sections shall have been negatived on divisions during the discussion.

10. No person other than a member of the Association shall be permitted to address the meetings unless by the unanimous consent of the members present.

11. The annual assessment upon each member shall be $3, which shall be payable at the October meeting in each year.

12. Previous to adjournment the place for the next meeting of the Association shall be determined by a majority vote.

13. The necessary standing committees shall be appointed by the Association at its October meeting.

14. These by-laws may be amended at any regular meeting of the Association by a two-thirds vote of the members present.

The officers for the ensuing year were elected as follows:

President, Peyton Randolph.
First Vice-President, T. M. Fish.
Second Vice-President, John Adams.
Third Vice-President, P. S. O'Rourke.
Secretary, Waterman Stone.
Assistant Secretary, D. W. Sanborn.
Treasurer, E. T. D. Myers.

Communications were received from Albert Allen, Superintendent Syracuse, Chenango & New York R. R., and W. F. Allen, of the *Official Guide*, which were read and placed on file.

Messrs. C. D. Hammond, E. T. D. Myers and J. E. Childs were appointed a committee to present subjects of discussion at the next meeting.

Wm. H. Stevenson, Esq., Shore Line Division, New York, New Haven & Hartford, was elected a member of the Association.

It was voted that the Secretary be authorized to have 500 copies of the constitution and by-laws printed, and that a copy be sent to each superintendent in America.

The committee on subjects for discussion reported a list of subjects, which were referred to committees, as follows:

Car Exchange, Messrs. Stone, Sandiforth and Sully.

Train Rules and Signals, Messrs. Hammond, Myers and Childe.

Uniform of Employés, Messrs. Stevenson, Franklin and Kline.

Injuries to Employés, Messrs. Metheany, Fish and G. R. Talcott.

The Committee on Subjects was made the Standing Committee for the ensuing year.

It was voted that the next meeting of the Association be held at the National Railway Club Room, No. 46 Bond street, New York.

The Secretary was requested to thank the proprietors of the Windsor Hotel for the courtesies and accommodations extended to this Association.

It was then resolved that the proceedings of this meeting be published in the *Railroad Gazette*, *Railway Age*, *Railway Review*, *Traveller's Official Guide*, and that other papers devoted to railway interests be requested to copy.

The meeting then adjourned.

COMMITTEE ON RULES AND SIGNALS.

The Committee on Rules and Signals request that each superintendent send a copy of his rules and regulations and time-table rules to the Chairman of the Committee, C. D. Hammond, Superintendent Albany & Susquehanna Railroad, Albany, New York.

The English Commission on Wind Pressure on Railway Structures.

One of the results of the Tay Bridge accident was the appointment by the English Board of Trade of a commission of engineers to consider the question of wind pressure on railroad structures. The report of this commission has just been published, accompanied by a long appendix and diagrams, showing upon what facts and calculations its conclusions are based. The report itself is as follows:

To the Right Honorable the President of the Board of Trade:

SIR: In compliance with the instructions from the Board of Trade (a copy of which is given in the appendix) to consider the question of wind pressure on railway structures, and to report to them on the subject, we have made such inquiries and procured such information on the subject referred to as we deemed necessary, and have now the honor to report the conclusions at which we have arrived.

It was necessary in the first instance to ascertain as accurately as possible from the resources which were accessible to us what the highest pressures of the wind in this country amount to. With this object we obtained from those observatories and stations where the pressure or velocity of the wind is measured the statements which we give in the appendix. In order to exhibit the action of the wind during heavy storms, we have also appended lithographed copies of wind diagrams taken by means of self-registering apparatus at Bidston, Glasgow and Greenwich. At some of the stations from which we have obtained returns the wind pressures are measured directly by Osler's self-registering pressure anemometers, at others the velocity only of the wind is measured by Robinson's rotating anemometers, the velocity of the revolving cups. For some stations the only published information is the run in miles of the wind during each hour. There can obviously be no more than a general accordance between this and the greatest pressure experienced during the hour. To utilize for our purpose observations taken at stations where the velocity only of the wind is recorded, the records of the Bidston Observatory, where both elements are recorded, have been employed as furnishing a means of connection between the two. In the case of high winds, with which alone we have to deal, it was found that the greatest pressure recorded in an hour was tolerably well proportional to the square of the mean velocity during the hour, and that the empirical formula $\frac{V^2}{100} = P$, where V = maximum run in miles of the wind in any one hour and P = maximum pressure in pounds on the square foot at any time during the storm to which V refers, represented very fairly the greatest pressure as deduced from the mean velocity for an hour. We have accordingly given in the appendix a table calculated from the above formula for deducing maximum pressures from observed velocities. In addition to the tables obtained from English, Irish and Scottish stations, which are those only that are strictly applicable to our inquiry, we give as matter of information a summary of strong winds registered at stations on the Continent and in India.

It will be seen on reference to the tables that the wind pressures vary greatly at different stations. This, no doubt, mainly arises from difference of exposure of the stations to the action of the wind in consequence of the geographical and local circumstances of their position, but may in some cases be partly caused by differences in the instruments used for measurement. Thus, at Glasgow the highest recorded pressure per square foot is 47 lbs., while at Bidston, near Liverpool, the indicated pressure on one occasion amounted to 90 lbs., and on another occasion to 80 lbs. But the pressures at Bidston seem very abnormal, being much beyond what have been noticed at any of the other stations. The conformation of the ground on which the Bidston Observatory stands in such that the velocity of the wind there might be greatly intensified. It will be noticed in the lithographs that the records of exceptionally high pressures indicate a very brief duration. From inquiries we have made we are satisfied that these records are not referable to instrumental error, depending on the recording instrument being carried by its momentum beyond the position of equilibrium under the wind pressure acting at the moment, but represent a real phenomenon. But whether the exceptionally high velocities to which such pressures are due extend over a considerable space in a lateral direction, or, on the other hand, are extremely local, is a point on which we have not been able to find experimental evidence.

The differences of the wind pressures observed at different stations led us to consider whether there were any other modes of approximately ascertaining the force of the wind for our purpose. There are many buildings, tall chimneys, shipbuilding sheds, etc., which probably would not withstand pressures so extreme as those we refer to; but in most cases the contour of the adjoining ground, and the obstruction to wind by adjoining buildings, trees and other surrounding objects, would render conclusions drawn from such cases unreliable. It occurred, however, to us that useful information might be drawn from another source, viz., from railways themselves. It is obvious that on existing railways that have been long in use, a serious of experiments, if we may apply such an expression to them, have for many years been carried on, for over them trains have been running at all times of the day and night on high and unsheltered embankments and along other spaces exposed in many cases to very strong winds. Now, a wind pressure varying from 30 lbs. to 40 lbs. per square foot is sufficient to overturn the ordinary railway carriages that have been in use during the last 25 or 30 years, and we thought it useful to inquire from the different railway companies for cases where railway carriages have been overturned by the force of the wind. The only cases of this kind that have been brought to our knowledge are appended to this report.

From the information thus acquired, from the inquiries we have made and from the consideration we have given to the subject, we are of opinion that the following rules will sufficiently meet the cases referred to us:

1. That for railway bridges and viaducts a maximum wind pressure of 56 lbs. per square foot should be assumed for the purpose of calculation.

2. That where the bridge or viaduct is formed of close girders, and the tops of such girders are as high or higher than the top of a train passing over the bridge, the total wind pressure upon such bridge or viaduct should be ascertained by applying the full pressure of 56 lbs. per square foot to the entire vertical surface of one main girder only. But if the top of a train passing over the bridge is higher than the tops of the main girders, the total wind pressure upon such bridge or viaduct should be ascertained by applying the full pressure of 56 lbs. per square foot to the entire vertical surface from the bottom of the main girders to the top of the train passing over the bridge.

3. That where the bridge or viaduct is of the lattice form, or of open construction, the wind pressure upon the outer or windward girder should be ascertained by applying the full pressure of 56 lbs. per square foot, as if the girder were a close girder, from the level of the rails to the top of a train passing over such bridge or viaduct, and by applying, in addition, the full pressure of 56 lbs. per square foot at the ascertained vertical area of surface of the ironwork of the same girder situated below the level of the rails, or above the top of a train passing over such bridge or viaduct. The wind pressure upon the inner or leeward girder or girders should be ascertained by applying a pressure per square foot to the ascertained vertical area of surface of the ironwork of one girder only situated below the level of the rails or above the top of a train passing over said bridge or viaduct, according to the following scale, viz: (*a*) If the surface area of the open spaces does not exceed two-thirds of the whole area included within the outline of the girder, the pressure should be taken at 28 lbs. per square foot; (*b*) if the surface area of the open spaces lie between two-thirds and three-fourths of the whole area included within the outline of the girder, the pressure should be taken at 42 lbs. per square foot; (*c*) if the surface area of the open spaces be greater than three-fourths of the whole area included within the outline of the girder, the pressure should be taken at the full pressure of 56 lbs. per square foot.

4. That the pressure upon the arches and the piers of bridges and viaducts should be ascertained as nearly as possible in conformity with the rules above stated.

5. That in order to insure a proper margin of safety for bridges and viaducts in respect of the strains caused by wind pressure, they should be made of sufficient strength to withstand a strain of four times the amount due to the pressure calculated by the foregoing rules. And that, for cases where the tendency of the wind to overturn structures is counteracted by gravity alone, a factor of safety of two will be sufficient.

With regard to the eighth paragraph of the report of the Select Committee on the North British Railway (Tay Bridge bill), to which you have drawn our attention, we beg to observe that where trains run between girders they will generally be sufficiently protected from the wind, the degree of protection afforded by the girders depending on the extent to which the girders are open or closed; where the girders are so open as to afford insufficient protection, or where trains run, as in some cases they may do, on the tops of girders, we assume that the engineer will provide a sufficient parapet, but we are indisposed to go further into detail on this subject, as it might tend to stereotype modes of construction, which we think is undesirable.

In conclusion, we beg to point out that the velocity of wind, like that of every other moving body, is more or less retarded by friction, and will be affected, therefore, by the character of the surfaces over which it has to pass, which may be rough, smooth, or irregular. It will follow, therefore, that, other things being the same, greater velocities will be attained at higher altitudes than at low ones, the wind at higher altitudes being further removed from retardation by friction. Though we are of opinion that no bridge or viaduct is likely to be built in such a situation as to expose it to wind pressures equal to those which have been occasionally indicated by the disc on the Bidstone Observatory, yet, even if that were possible, a bridge or viaduct constructed according to the rules we have given would not be subjected to strains nearly equal to its theoretical strength. On the other hand, there will be many structures of small altitude or in sheltered situations which never can be exposed to the wind pressure we have assumed, and where the application of the rules we have given would require modification. Some modification of the rules may also be required in the case of suspension or other bridges of very large span, but such cases will be of rare occurrence, and we recommend that they should be specially considered when they arise.

We have the honor to be, sir,
Your most obedient servants,
JOHN HAWKSHAW,
W. G. ARMSTRONG,
W. H. BARLOW,
G. G. STOKES,
W. YOLLAND.

We, the undersigned, concur in the above report so far as it goes, but we think the following clause should be added, viz.:

The evidence before us does not enable us to judge as to the lateral extent of the extremely high pressures occasionally recorded by anemometers, and we think it desirable that experiments should be made to determine this question. If the lateral extent of exceptionally heavy gusts should prove to be very small, it would become a question whether some relaxation might not be permitted in the requirements of this report.

W. G. ARMSTRONG.
G. G. STOKES.

THE SCRAP HEAP.

Pittsburgh Excursion Business.

The Pittsburgh *Leader* says: "A business, that has originated within the past few years and has grown to immense proportions, is that of taking picnic parties to some point on the various railroads, at some distance from the city, and allowing the persons composing the parties an opportunity to spend a day in the pleasant rural spot in enjoyment with their friends. All the railroads centering in the city have of late years established groves of their own, which they give to parties getting up a picnic free of charge, and haul those attending to and from the grove at special rates. This system, which has become very popular, was originated by J. Morton Hall, passenger agent of the Allegheny Valley Railroad, who, in 1876, opened the grove at Hulton station, 10 miles from the city, and offered it free of charge to any reliable person or persons, who desired to picnic for a day in the country. Since that time all the roads have followed the example of the Allegheny Valley, and immense numbers of people have taken advantage of their offers of free groves, and have put in a day's sport in the woods. The groves are furnished with platforms for dancing, and with every convenience necessary for any style of a picnic, either those given by private individuals, societies or Sunday schools. Mr Hall stated to a *Leader* representative yesterday that since the Hulton grove was opened the Valley road has carried 100,000 picknickers there and back, and that too without an accident or injury to one of them. During the summer just ended ninety picnics were held at Hulton, and the grove was occupied every day that the weather was favorable. Some very large church picnics have been held there, notably those of the Smithfield street German Lutherans, which always take several trains to haul the people to the grove and back. Mr. Hall was instrumental in getting the Orangemen to abandon their yearly parade and substitute instead a picnic out of the city. For the last four years the Orangemen have held their picnic at Hulton, and on the occasion of the last one 50 car loads of people went to the grove, against seven car loads the first year.

"As to the excursion business in general, Mr. Hall states that it never was so great on any of the roads as during the season just closed. On the Valley road 1,000 more people went to Niagara and Toronto this year than last. During last summer an excursion left every two weeks on the Valley road for Chautauqua, Niagara and Toronto."

Premium for Freedom from Accident.

A decidedly novel expedient for preventing railway accidents has just been devised by a reflective Englishman, whose scheme, however, we regret that we cannot approve. He proposes to remit the passenger duty to every line that gets through the twelve months without any preventable accidents. There are two slight objections to be urged against such a scheme. In the first place, the government would object to cut ing off a source of revenue, while in the second, the general public would complain, and not without justice, that the railroad companies were being bribed to do their bounden duty. In point of fact, it is to the interest of every railroad company to have as few accidents as possible, and juries will always be inclined to deal severely with corporations which cannot show that the best care was taken in equipping and conducting their trains. The English companies are behind us in some respects, and are too frequently inclined to treat with contempt the recommendations of the Board of Trade, as, for instance, in the matter of brakes. We may, however, all of us live to see a system of railroad passenger insurance, by virtue of which the company transporting a passenger will be bound to pay a certain sum in case of death, and a certain sum in case of injury, the whole settlement being adjusted as quickly and as quietly as a loss by fire or by death, in a fire or life insurance company.—*New York World.*

Locking Railway Car Doors in England.

The locking of the doors of railway carriages is one of the mysteries of railway management. No passenger has ever been able to divine why such infinite pains are taken to lock him in. The only result of the process is that if there is an accident he is a prisoner, with a chance of being killed. If, on the contrary, his train arrive safely at his destination, he is still a prisoner, who has to wait till he is liberated, making, meanwhile, spasmodic signals to attract some friendly porter for the purpose, unless, having grown wise by experience, he carries a key himself, and is able triumphantly to emerge. Some people imagine that a regulation of the Board of Trade obliges this extraordinary precaution. No such regulation, however, exists. On the contrary, the greatest diversity of practice prevails on the subject. One company locks its carriage doors on the main line only, another on the branch and main lines both, a third on single lines only, a fourth does not lock its doors at all. And the extraordinary thing is, that the companies that entirely neglect the custom find no disadvantage whatever in doing so. On the contrary, their porters are able to attend to other matters during the time when they would have been locking and unlocking doors. The following are the railway companies who do not lock their doors on either side of their trains: In Scotland—The Glasgow & Southwestern, Great Northern of Scotland, Highland and North British. In England—Great Eastern, London, Chatham & Dover and Northeastern. It is hard to see why in these days of falling dividends other companies do not follow their example.—*Pall Mall Gazette.*

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

LOSSES BY THE RAILROAD WAR.

Notwithstanding the much lower rates on east-bound freight this year, the amount of through freight eastward over the trunk lines since the railroad war broke out has been almost exactly the same this year as last—the amount for twelve weeks was not 1½ per cent. greater this year. Grain was carried last year on the basis of 30 cents per 100 lbs. from Chicago to New York; this year for perhaps the first seven weeks at 15 and the other five at 12½, with some shipments of flour at still lower rates than these. The *amount* of reduction on provisions and other classes was as great—that is, from 15 to 17½ cents per 100 lbs. less than last year's rates. Taking the roads from the Mississippi east, over which through rates are made on the Chicago basis, and the indisputable returns of traffic over the trunk lines indicate that their aggregate net earnings from east-bound through traffic have been about $2,000,000 *a month* less this year than last, since the 15-cent rate was made. This does not include the live-stock traffic, which amounts to about a million of tons a year, and which at full (but moderate) rates would yield $10,000,000 a year. The *regular* reduced rate made last spring (25 cents a ton, made in consequence of cuts), reduces this $5,000,000 a year, and hardly a ton more is carried because of the lower rates; and the actual rates, by the way, are probably somewhat below the 25 cent basis. It should be said, however, that last year rates were not maintained on live stock, though propably an average of 35 cents was obtained, or at the rate of more than $2,000,000 a year more than at present. If the rates received in 1880 had been lower by these amounts, the total earnings from the total east-bound traffic (11,500,000 tons, including live stock and shipments to local points on the trunk lines) would have been more than $28,000,000 less than they actually were. Add to this a loss of $7,800,000, which would have been the result of applying the current *west*-boundt rates to the west-bound traffic of the year ending with July last, and we have a total of $35,800,000 as the direct loss caused by the current low through freight rates applied to the actual traffic of a past year. How important this sum is to the railroads may be judged by the fact that in the last year reported the entire amount disbursed in dividends by *all* the railroads of the United States was $77,115,411. We have had now three months of these great losses from the east-bound and two months of those from the west-bound freight; they have been to a certain extent endurable by reason of the vast local traffic, but with the great increase in local traffic a decrease in local rates would have been possible but for the great losses on through freight, and any considerable reduction of local rates will continue to be impossible so long as such railroad wars occur. As it is the roads whose traffic is chiefly through have generally had a serious reduction in their net earnings.

We would not hold, however, that the railroads would have had as much east-bound freight if they had maintained the 30-cent rate of last year. By reducing it to 15 and 12½ cents they have succeeded in getting only a trifle more than last year, and their low rates have undoubtedly diverted some traffic from the lakes and a good deal from the canal, the freight this year having come to a much larger extent than last year from the country west of Lake Michigan, which can ship as conveniently by lake as by rail. But with rates 25 cents a hundred probably shipments would have been not much less than they have been (for lake vessels have not been too plenty as things were, and have generally been fully and profitably employed in spite of the railroad competition); and at 20 cents a hundred scarcely a bushel less would have gone by rail. Five cents per 100 lbs. on last year's business would be $11,500,000, and 10 cents $17,250,000, and if these rates had been *necessary*, the losses per year would be so much less. We do not pretend to say what the effect of a higher rate would have been on this year's traffic, but confine ourselves to calculating the effect of the difference this summer between this year's and last year's rates when applied to the whole of last year's through freight traffic, which, as we have said, is a decrease of about $35,800,000 in the gross receipts from it. Besides this we have the losses from the passenger war.

We must remember that there has not been a whole year of "war rates," but only three months of them on the east-bound and two on the west-bound freight, which, assuming them to be average months, would give a loss of about $7,300,000. And there is not the slightest probability that the war will continue for twelve months. No railroad war ever has, we believe, lasted so long. The great war of 1876 lasted about seven months, though its effects, on account of the great number of time contracts, were felt much longer. It left the railroads terribly exhausted, as local business then, except Centennial travel (which profited but few roads), was very light, and the harvest of 1876 was wretched, so that down to August of 1877 traffic of almost all kinds was extraordinarily light. The circumstances are as different as possible now. The local freight and travel are probably larger than ever before. There will not be so much grain to carry east as in the two years previous, doubtless, but the other through traffic will probably be larger. The farmers have been enriched by four successive abundant crops, and are not going to be made poor and to greatly limit their purchases by one bad one. Those who have a merely tolerable crop will receive so much from it on account of the high prices that they will often be quite as well off as last year. The enormous activity in railroad and other construction requires of itself a vast amount of traffic, and this construction cannot be checked by bad crops; nothing but serious financial disaster will do this. The remarkably large profits shown by the vast Pennsylvania system in July and August, in spite of the railroad war (and this company probably carries one-quarter or more of the whole freight affected), and shown also by the Erie in July, indicate that whatever the losses by the railroad war, there is not likely to be any positive financial embarrassment resulting from it. The Pennsylvania, the Baltimore & Ohio and the New York Central will continue to pay dividends at the old rate, the Erie stockholders and those of some Western roads will have their hopes of dividends still further deferred, probably, and some Western roads will probably pay (as they will certainly earn) less than last year. But there is not the slightest sign as yet that anyone is going to be bankrupted.

Are, then, things well enough as they are? By no means. As long as the present through rates are continued the whole burden of paying interest on the cost of the railroads is saddled on the local traffic. It may be said that it is paying no more than formerly, and so has no right to complain. But the local shippers have a right to complain if the through traffic is not made to pay some part of the interest on the cost of the roads which it uses. If it paid what it might be made to pay (which is generally but a moderate amount and not infrequently but a very small part of what the local traffic must pay on the same amount of transportation, the burdens on the local traffic might be reduced. The latter has no right to complain if it pays more for profit than the through freight pays; usually it must pay more, and frequently with perfect justice several times as much. But it need not and ought not to pay *all* the profits of the railroad, which in times like these it is made to do.

MICHIGAN CENTRAL PROFITS.

The Michigan Central is the first railroad to show the effects of the railroad war on the stockholders' interests. For the quarter ending with September the directors have resolved that no dividend be made. Last year the company made two four per cent. dividends and had a little surplus left. It was then resolved to make the dividends quarterly thereafter, and the opinion seemed to prevail among investors that the stock would thereafter be good for 2 per cent. quarterly, and the price went up to 130. For the first quarter of this year, however, only 1½ per cent. was paid, and this could not possibly have been earned *in that quarter*, the bad winter having greatly increased expenses as well as reduced earnings. It was perfectly proper, however, to make up the dividend from any surplus on hand. For the second quarter, during nearly the whole of which good rates were had on nearly all traffic (not on live stock), 1 per cent. was paid, and a statement was issued for the first half of the year. This showed that the net earnings has been $1,295,000, against $1,700,000 in the first half of 1880, and that the surplus over fixed charges (the stockholders' profits) were but $442,000, against $850,000 the year before. The 2½ per cent. paid in dividends for this half-year required $26,455 more than the $442,000. As the weather was not particularly unfavorable in the second quarter and the expenses (aside from those required on account of the traffic and weather of the previous quarter) were probably not extraordinarily great, while there was good traffic and generally good rates, we may believe that the larger part of the profits of this half-year were made in the second quarter.

The resolutions accompanying the decision of the directors this week not to make any dividend for the third quarter of this year say that the expenses of the quarter have been largely increased, while rates have been materially reduced, that the net earnings for the quarter are "less than 1 per cent.," and that there is no surplus on hand for dividend purposes.

The increase of expenses on this road is doubtless chiefly due to larger traffic, but also to a considerable extent to higher prices. While the total through freight of the trunk lines, in spite of the very low rates, has been very little larger this year than last, the through Chicago shipments have been very much larger—61 per cent. more. Now, of the through traffic of the Michigan Central an overwhelming proportion is Chicago traffic; it has no affluents of importance elsewhere except at Joliet. It has carried at least as large a proportion of the Chicago traffic this year as last; and so, during the quarter, must have had something like 60 per cent. more through freight eastward than last year, which cannot have been carried without a considerable increase in expenses. The same is true of the through passenger traffic. The chief cuts, and consequently the chief increase in travel, have been on Chicago passengers; and the Michigan Central is a favorite passenger route for New York, and still more for Boston and New England travel. The great increase in through west-bound freight in August and September has not, probably, made much difference in the expenses, as no addition to the trains or cars hauled was needed to carry it.

Not only is most of this company's business through Chicago traffic, but by far the larger part of all its traffic is through. In 1880 no less than 54.7 per cent. of its passenger-miles even was through, and 70 per cent. of its ton-miles. Very few roads in the country have anything like so large a proportion of through traffic, so that very few lose so large a proportion of their earnings and profits by the reduction of through rates to less than cost. Even on the New York Central in the last year reported, the through freight (including Buffalo-Albany as well as Buffalo-New York shipments) made but 60.4 per cent. of the ton-mileage,

LOCOMOTIVE WH

No	NAMES OF ROADS.	No. 1. Apply Brakes. Stop.	No. 2. Release Brakes. Start.	No. 3. Back.	No. 4. Highway Crossing Signal.	No. 5. Send out Flagman. Stop following Train.	No. 6. To recall Flagman.	No. 7. Approaching Stations.	No. 8. Call for Switchman.	No. 9. Note Flag on Engine.	No. 10. Answer to No. 9.	No. 11. Cattle on Track.	No. 12. Alarm Stop th Train.
1	Alabama Great Southern	o	oo	ooo			oooo	—	oooo			o +	
2	Allegheny Valley	o	oo	ooo	oo —	ooooo	oooo			oooo	oo		
3	Annapolis & Elk Ridge	oo	o	ooo	— — oo	ooo	oooo	—					
4	Atchison, Topeka & Santa Fé	o	oo	ooo	— oo		oooo						
5	Atlantic & Pacific	o	oo	ooo	— oo		oooo		ooeo			o +	
6	Baltimore & Ohio—Main Line	oo	o	ooo	oo —	ooo	oooo		oooo			o +	
7	» » Pittsburg Division	o	oo	ooo	— — oo	oo —	oooo	—	oooo				
8	» » Trans-Ohio Div	o	oo	ooo	oo —	— o —	oooo	— 5 sec.		oooo	oo		ooo
9	Baltimore & Potomac	o	— —	ooo	— — oo	ooooo	— — — —		oo oo oo	o o			
10	Barclay	o	oo	ooo			oooo	— 5 sec.	ooo			o +	
11	Bedford, Springville, Owensboro & Bloom.	e	oo	ooo						oooo			
12	Bennington & Rutland	o	oo	ooo	—		oooo	—		ooooooo			
13	Boston & Albany	o	oo	ooo	—	— —	oooo						
14	Boston & Lowell	o	oo	ooo			oooo		ooooo				
15	Boston & Maine	o	oo	ooo			oooo						
16	Boston & New York Air-Line	o	oo	ooo	o —		— — — —			oooo		o +	o +
17	Boston, Barre & Gardner	o	oo	ooo	—				oooo				
18	Boston, Hoosac Tunnel & Western	o	oo	ooo	— —		oooo			ooooo			
19	Buffalo, Pittsburg & Western	o	oo	ooo	ooo		oooo	—	5 or more o				
20	Burlington, Cedar Rapids & Northern	o	oo	ooo	— oo		oooo	—					5 or mor
21	Camden & Atlantic	o	oo	ooo	—		— — — —	—	— — oo	ooo		o +	o +
22	Canadian Pacific—Eastern Division	o	oo	ooo	oo			—	oooo				
23	Canada Southern	o	oo	ooo	— oo		ooooo			oooo	oo	o +	
24	Carolina Central	oo	o	ooo			ooooo						
25	Catasauqua & Fogelsville	o	oo	ooo	— — — oo		oooe						
26	Central Iowa	o	oo	ooo	— o		oooo	—		ooooo		o +	
27	Central Pacific	o	oo	ooo			oooo						o +
28	Central Railroad of Georgia	o	oo	ooo	—								
29	Central Railroad of New Jersey	o	oo	ooo	— — oo	— — —	— — — —		oooo	o +			e +
30	Central Vermont	o	oo	ooo	—	— — o	— — — —	—	— — — —	ooooooo		o +	
31	Chesapeake & Ohio	o	— —	ooo	— — oo	ooooo	— — — —	— 5 sec.		ooo	—	o +	
32	Chicago & Alton	o	oo	ooo	— oo		— — — —			ooooo	oo		
33	Chicago & Grand Trunk	o	oo	ooo	— oo		ooooooo	—	oooo	ooooo		o +	
34	Chicago & North-Western	oo	o	ooo	— 3 sec.			— 3 sec.					o +
35	Chicago & West Michigan	o	oo	ooo	ooo		ooooooo		— — —				
36	Chicago, Burlington & Quincy	o	oo	ooo	— o		oooo	— 5 sec.	oooo	oo o	oo o		
37	Chicago, Milw. & St. Paul—River Div.	o	oo	ooo	— o	— — oo	ooooooo	—	oooo	oooo	oooo		
38	Chicago, Milw. & St. Paul—P. D. C. Div	o	oo	ooo	— o		ooooooo	—	oooo	oo o	oo o		
39	Chicago, Pekin & South-Western	o	oo	ooo			oooo	— 5 sec.				o +	
40	Chicago, Rock Island & Pacific	o	oo	ooo	— o		oooo	— 10 sec.		ooooo		o +	o +
41	Chicago, St. Paul, Minneapolis & Omaha	oo	o	ooo									o +
42	Chicago, St. Louis & New Orleans	o	— —	ooo	— — oo		— — — —	— 5 sec.		ooooo		o +	
43	Cincinnati, Hamilton & Dayton	o	oo	ooo	oo —		ooooo	—				o +	
44	Cincinnati, Ind. St. Louis & Chicago	o	oo	ooo			oooo	—				o +	o +
45	Cincinnati, Wabash & Michigan	o	— —	ooo	oo		oooo						
46	Cleveland, Tuscarawas Valley & Wheel	o	oo	ooo	oo —		— — — —	—					
47	Columbia & Greenville	o	oo	ooo	— — oo		oooo	—		o —	o —	(o —) +	
48	Columbus & Hocking Valley	o	oo	ooo	oo —		— — — —					o +	
49	Concord & Claremont	o	oo	ooo	— 8 sec.			— 8 sec.					o +
50	Concord	o	oo	ooo	— 8 sec.			— 8 sec.					o +
51	Connecticut Western	o	oo	ooo	—			—	oooo				
52	Cumberland Valley	o	— —	ooo	— — oo	ooooo	— — — —	— 5 sec.	ooo			o +	
53	Danbury & Norwalk	oo	e	ooo	—		oooo	—	oooo				
54	Danville & South-Western	e	oo	ooo			oooo						
55	Delaware & Hudson Canal Company	o	oo	ooo			oooo						
56	Delaware, Lackawanna & Western	o	oo	ooo	—		oooo						
57	Delaware Western	oo	o	ooo	— 6 sec.		oooo		oooo				
58	Denver & Rio Grande	e	oo	ooo			oooo	—		ooooo	oo	• +	
59	Des Moines & Fort Dodge	o	oo	ooo			oooo			ooooo			
60	Detroit, Lansing & Northern	o	oo	ooo			ooooooo		oooo				
61	Dubuque & Dakota	oo	o	ooo	— 3 sec.		oooo	— 3 sec.	oooo				o +
62	Dunkirk, Allegheny Valley & Pittsburg	o	oo	ooo	oo		oooo						
63	Eastern	o	oo	ooo	—		o +		oooo	— oo	— oo		
64	East Line & Red River	o	oo	ooo			oooo						
65	East Tennessee, Virginia & Georgia	o	oo	ooo	— — oo	ooo	oooo	—		o —	— o	(— o) +	
66	Eureka & Palisade	e	oo	ooo			oooo						o +
67	European & North American	o	oo	ooo			oooo			— oo	— oo		
68	Evansville & Terre Haute	o	oo	ooo	oo —		oooo	—	oooo	ooooo		o +	
69	Fitchburg	o	oo	ooo	— 3 to 8 sec.		oooo						
70	Fort Madison & North-Western	o	oo	ooo	— oo		oooo	—					o +
71	Fort Wayne, Muncie & Cincinnati	e	oo	ooo			oooo						
72	Foxburg, St. Petersburg & Clarion	o	oo	ooo	—	ooooo	oooo						
73	Freehold & New York	oo	o	ooo	— — oo		oooo	— 5 sec.					
74	Galveston, Harrisburg & San Antonio	e	oo	ooo			oooo					o +	
75	Galveston, Houston & Henderson	e	oo	eoo			oooo	—		ooooo	ooooo		
76	Georgia	oo	o	ooo	o — o	— — —	— — —	—		oooo	oo	o +	
77	Grand Rapids & Indiana	e	oo	ooo	oo —		oooo	—		oooo	oo	o +	
78	Grand Trunk	o	oo	ooo	— o								
79	Great Western	o	eo	ooo					oooo				
80	Green Bay & Minnesota	oo	e	ooo	— 2 sec.		oooo	— 4 sec.	oooo				o +
81	Hannibal & St. Joseph	e	oo	ooo	oo		oooo	—		ooooo			
82	Havana, Rantoul & Eastern	o	oo	ooo	—				oooo	ooooo	o	o +	
83	Housatonic	e	oo	ooo									
84	Houston & Texas Central	o	oo	ooo			oooo						
85	Houston East & West Texas	o	oo	ooo			oooo						
86	Illinois & St. Louis	e	oo	ooo	— oo		oooo	—				o +	
87	Illinois Central	oo	o	ooo	— 2 sec.		ooooo						
88	Illinois Midland	oo	e	ooo			oooo		ooooo	ooooo		o +	o +
89	Indiana, Bloomington & Western	o	oo	ooo	— — oo		oooo	—					o +
90	Indianapolis & St. Louis	o	oo	ooo	oo —		ooooo	—					
91	International & Great Northern	o	oo	ooo			oooo			ooooo			
92	Jeffersonville, Madison & Indianapolis	o	oo	ooo	—					oooo			
93	Kansas City, Fort Scott & Gulf	o	oo	ooo	—		oooo			ooooo		o +	
94	Kansas City, Lawrence & South. Kansas	e	oo	ooo	—		oooo			ooooo		o +	
95	Kansas City, St. Joseph & Coun. Bluffs	e	oo	ooo	— o		oooo	— 5 sec.	oooo	ooo	ooo		
96	Lake Erie & Western	e	oo	ooo	oo		oooo	— 2 sec.		ooooo			ooooo
97	Lake Shore & Michigan Southern	e	— —	ooo	oo		oooo	—					
98	Lebanon Springs	o	oo	ooo	—								
99	Lehigh Valley	e	oo	ooo		ooo	oooo						
100	Little Rock, Mississippi River & Texas	o	oo	ooo			oooo oooo	— oo		ooooooo		o +	
101	Long Island	e	oo	ooo	— oo	— — —	oooo	—	ooooo			o +	
102	Louisiana Western	o	oo	ooo	— — oo		oooo					o +	
103	Louisville & Nashville	o	oo	ooo	oo —		oooo	—	oooo			o +	—
104	Louisville, New Albany & Chicago	o	oo	ooo	—		oooo		oooo				
105	Louisville, New Albany & St. Louis	o	oo	ooo	oo —		oooo	—	oooo				
106	Maine Central	e	oo	ooo	—		oooo		oooo	ooooo		o +	
107	Marietta & Cincinnati	e	oo	ooo	oo —		oooo	—		— oo			
108	Marquette, Houghton & Ontonagon	e	oo	ooo	oo —		oooo			ooooo			o +
109	Michigan Central	e	oo	ooo	— oo		ooooooo	—		ooooo			
110	Milwaukee, Lake Shore & Western	e	oo	ooo	— 4 sec.		oo oo	— 4 sec.	oooo				
111	Minneapolis & St. Louis	e	oo	ooo	oo —	— o —	oooo	— 5 sec.	oooo	ooooo		o +	
112	Missouri Pacific	o	oo	ooo			oooo			ooooo	oo	o +	
113	Mobile & Ohio	e	oo	ooo			oooo			ooooo			
114	Morgan's Louisiana & Texas	o	oo	ooo				—	o +			o +	
115	Nashville, Chattanooga & St. Louis	o	oo	ooo	— 5 sec.		— — — —	— 5 sec.		ooooo		o +	
116	Naugatuck	o	oo	ooo			oooo			ooooo			
117	Nevada Central	o	oo	ooo			oooo						
118	Newburg, Dutchess & Connecticut	e	oo	ooo			oooo						
119	New Haven & Northampton	o	oo	ooo	oo —			—		ooooooo			
120	New Jersey & New York	e	oo	ooo	—								
121	New York & New England	o	oo	ooo	—		oooo	—					
122	New York Central & Hudson River	o	oo	ooo	— 4 sec.		— o — o — o	—	oooo	ooooooo			
123	New York, Lake Erie & Western	e	oo	ooo	—		oooo	—	oooo				
124	New York, New Haven & Hartford	o	oo	ooo									
125	New York, Ontario & Western	o	oo	ooo	—		oooo		oooo				
126	New York, Pennsylvania & Ohio	e	oo	ooo	—		oooo	—	oooo			o +	
127	Norfolk & Western	e	oo	ooo	oo —		oooo						
128	North-Eastern (S. C.)	o	oo	ooo	—		— — — —	— —	oooo				o +
129	Northern Central	e	— —	ooo	— — — oo	ooooo	— — — —	— 5 sec.		ooo		o +	
130	Northern (N. H.)	o	oo	ooo	— 8 sec.			— 8 sec.					o +
131	Northern Pacific	o	oo	ooo	— o		ooooo			oooo	oooo		
132	North Pacific Coast	e	oo	ooo			oooo						
133	Ohio & Mississippi	o	oo	ooo	— o —		oooo	—		ooooo		o +	
134	Ohio Central	o	oo	ooo	— — oo		— — — — —			ooooooo		o +	
135	Old Colony	o	oo	ooo	— — — oo	— —	oooo		ooooo	— oo	— o o		
136	Oregon & California	o	oo	ooo			oooo		oooo				
137	Paducah & Elizabethtown	o	oo	ooo	oo —		oooo	—	oooo			o +	
138	Painesville & Youngstown	o	oo	ooo			oooo						
139	Pennsylvania	o	— —	ooo	— — — oo	ooooo	— — — —	— 5 sec.		ooo		o +	
140	Peoria, Decatur & Evansville	e	oo	ooo	ooo		oooo	—		ooooo		o +	
141	Perkiomen	e	oo	ooo	— — — oo	— — —	— — — —			o +		o +	
142	Petersburg	o	— —	ooo	— — — oo	ooooo	— — — —	— 5 sec.		ooo	oooo	o +	
143	Philadelphia & Atlantic City	o	oo	ooo	— — — oo	ooooo	— — — —	— 4 sec.	— — — —	— — —		o +	
144	Philadelphia & Reading	o	oo	ooo	— — — oo	— — —	— — — —	—		o +		o +	
145	Philadelphia, Newtown & New York	o	oo	ooo	— — — oo	— — —	— — — —			o +		o +	
146	Pittsburg & Lake Erie	o	oo	ooo	oo —	— o —	— — — —	— 5 sec.		oooo	oo	o +	
147	Pittsburg, Cincinnati & St. Louis	o	— —	ooo	— — — oo		— — — — —	— 5 sec.	oooo	oooooo		o +	
148	Pittsburg, Fort Wayne & Chicago	e	oo	ooo	oo —		ooooo		ooooooo	oooo	oo		
149	Portland & Rochester	o	oo	ooo			oooo		oooo	— oo	— oo	o +	
150	Port Royal & Augusta	oo	o	ooo			oooo						
151	Poughkeepsie, Hartford & Boston	e	oo	ooo	—								
152	Prince Edward Island	o	oo	ooo	—			—	oooo	— — — —			o +
153	Providence & Springfield	o	oo	ooo					oooo				
154	Providence & Worcester	o	oo	ooo	oo	— —	oooo	oo					
155	Quebec, Montreal, Ottawa & Occidental				— —								
156	Richmond & Alleghany	o	oo	ooo			oooo	—		oooo		o +	
157	Richmond & Danville	o	oo	ooo	— — — oo	ooooo	ooo	—		o —	— o	o +	
158	Rochester & Pittsburg	o	oo	ooo	—		ooooo	—	oooo				
159	Rock Island & Mercer County	o	oo	ooo	—								
160	Rome, Watertown & Ogdensburg	o	oo	ooo			oooo	—		ooooooo			
161	St. Johnsbury & Lake Champlain	o	oo	ooo					oooo				o +
162	St. Joseph & Des Moines	o	oo	ooo	— oo		oooo	— 5 sec.	oooo				
163	St. Louis & Cairo Short Line	o	oo	ooo	oo —		oooo						
164	St. Louis & San Francisco	o	oo	ooo			oooo			ooooo			
165	St. Louis, Iron Mountain & Southern	o	oo	ooo	—		oooo	—	oooo	ooooo		o +	—
166	St. Louis, Keokuk & North-Western	o	oo	ooo					oooo				
167	St. Louis, Salem & Little Rock	o	oo	ooo			oooo			ooooo			
168	St. Paul, Minneapolis & Manitoba	o	oo	ooo	— o		ooooo	—	oooo	ooo	ooo		
169	Sacramento & Placerville	o	oo	ooo			oooo						o +
170	San Francisco & North Pacific	o	oo	ooo					oooo				o +
171	Savannah, Florida & Western	o	oo			ooo				o oo	ooo		
172	Scioto Valley	o	oo	ooo	oo —		oooo	—		ooooo		o +	
173	Shenandoah Valley	o	— —		— — — oo	ooooo	— — — —	— 5 sec.		— — —		o +	o +
174	South Carolina	o			oo —	ooo		—					
175	South-Eastern	o	oo	ooo	— oo				oooo				
176	Southern Pacific	o	oo	ooo			oooo						o +
177	Stony Creek	o	oo	ooo	— — — oo	— — —	— — — —			o +		o +	
178	Syracuse, Binghamton & New York	o	oo	ooo			oooo						
179	Texas & Pacific	o	oo	ooo			oooo			ooooo	ooooo		
180	Texas & St. Louis	o	oo	ooo	—		oooo		oooo	ooooo		o +	
181	Toledo, Ann Arbor & Grand Trunk	o	oo	ooo	oo —		ooooo	— 5 sec.	ooooooo	oooo	oo	o +	
182	Toledo, Delphos & Burlington	o	oo	ooo	oo —		oooo						
183	Troy & Boston	o	oo	ooo	o					ooo oo			
184	Union Pacific	o	oo	ooo			oooo		oooo				
185	Utica & Black River	o	oo	ooo	—							o +	
186	Valley	o	oo	ooo	oo —			— 5 sec.	oooo	ooooo		ooooooo +	—
187	Vandalia Line	o	oo	ooo			oooo	— 5 sec.		ooooo		o +	o +
188	Virginia & Truckee	o	oo	ooo			oooo						o +
189	Virginia Midland	o	oo	ooo	—	— — —	oooo	— —	oooo	—o—	—	o +	
190	Wabash, St. Louis & Pac.—Eastern Div.	o	oo	ooo	— —		oooo			ooooo		o +	
191	» » » Western Div.	o	oo	ooo	—		oooo			ooooo			
192	West Chester & Philadelphia	o	— —	ooo	— — oo	ooooo	— — — —	— 5 sec.		ooo		o +	
193	Western Maryland	o	— —	ooo	— — oo	ooooo	— — — —	— 5 sec.		ooo		o +	
194	Wilmington & Northern	o	oo	ooo	— — oo	oooo	—					o +	
195	Wilmington & Weldon	o	— —	ooo	— — oo	ooooo	— — — —	— 5 sec.		ooo	oooo	o +	o +
196	Wisconsin Central	o	oo	ooo	— oo	oo	ooooo	— 5 sec.	oooo	ooooooo		o +	
197	Worcester & Nashua	o	oo	ooo		— 3 sec.	— — 3 sec.	— 5 sec.	ooo				
198													

EXPLANATIONS: o signifies a short sound; —— long sound; + affixed signifies a succession of the sounds indicated by

SUMMARY OF SOUNDS USED FOR WHISTLE SIGNALS { Short ...o; o o; o o o; o o o; o o o; o o o o; o o o
Long ...——; —— 2 sec.; —— 3 sec.; —— 4 sec.; —— 5
Mixed ..o ——; —— o; o —— o; o o ——; —— o o;

WHISTLE SIGNALS.

No. 11. Cattle on Track.	No. 12. Alarm. Stop the Train.	No. 13. Train has Parted.	No. 14. Railroad Crossing.	No. 15. Response to Bell Signal.	No. 16. For Fuel.	No. 17. Call for Signals.	No. 18. Answer to Flag or Signal.	No. 19. Bridge or Tunnel Warning.	No. 20. Fire Alarm.	No. 21. Call for Assistance.	ADDITIONAL SIGNALS.
o +											
				o							
o +		—— o		o o							
o +		—— o		o o							
	o o o	— o —						o o ——		Several ——	(o) Response to bell signal to stop at next station.
		o o o ——						o o o o o			(o o o) Reduce speed.
		— —— o						o o o o			(o o o o) To see if train men are at posts.
o +						o o o o		—— 5 sec.			(o o) Response to bell signal to stop at next station.
					o o o o o						
		o o o o o									(——) Calls in head brakeman.
o +	o +								—— o o o o		(o —— o) Stop at next station. (—— —— ——) Will take side track.
	5 or more o		——								
o +	o +			o o		o o o o					
o +					o o o o						
o +								o o o o o			
	o +										
	o +							—			(o o) Response to bell signal *not* to stop at next station.
o +		—— o	——			o o o o					(o o) Response to bell signal to stop at next station. (o o o) Diminish speed.
o +			—— 5 sec.								(o o) Response to bell signal to stop at next station.
o +	o +			o o			o o				(o o) Engineer's notice to stop train.
											(—— —— —— ——) Drawbridge signal.
		—— o o ——									
		o o o o o									(—— —— o o) Engineer's notice to stop train.
		—— o o ——									
o +											
o +	o +										
o +	o +					o o o o					(o o) Response to bell signal to stop at next station.
o +		— o ——									
o +		o ——						—			
o +	o +										
		—— o									(o o o) Reduce speed.
——) +		—— o ——		o o						—— +	(o o o) Engineer's notice to stop train.
o +											
	o +										
	o +										
o +			—— 5 sec.		o o o o						(o o) Response to bell signal to stop at next station. (——) Signal for [drawbridge.
											(o o o) Stop at next station.
• +		(—— o) +									
	o +										
										—— o o o o o o	
										—— +	
—— o) +	o +	—— o ——									
						o o o					(o o o) " Flag station."
o +											(o o o) Will make flying switch.
	o +	—— o o ——	——						—— o o o o o		(o o) Stop at next station.
					o o o o o						
o +					o o o o						
o +							o o				
o +											(o o) Alarm and warning to trainmen to be ready to apply brakes.
	o +		—— 4 sec.								
o +					o o o o o						(o o o) Stop at next station.
o +				o o							
o +	o +	o +	—								(o o) Response to bell signal to stop at next station.
	o +	—— o	——	o o	o o o o						(o o o) Stop at next station.
								o o o o			
o +											
o +		—— o o ——									
	o o o o o o										
											(o o o o) Calls brakemen to engine.
										o o o o 3 times.	
o +				o o							
o +					o +						
o +			—								
o +											(o o o) Reduce speed. Also, " Flag us to next station," and response.
	o +			—— o o							
			——								
	o +				o o o o o						(o o) Response to bell signal to stop at next station.
o +			—— 4 sec.					——			(o o o) Call to see if brakemen are in places.
o +		o o o o									
o +			—— 5 sec.	o o	o +	o o o o					
					o o o o o						
			——		o o o o o						
					o o o o						(—— —— ——) Will take side track.
											(—— o o) Stop at next station.
o +											
	o +			o o o				—— o			(o o) For No. 15 on Virginia and Tennessee Division.
o +			—— 5 sec.	o o		o o o o				(—— o) +	
	o +										
		— o o —									
o +											
o +									— o o o		(—— —— ——) Will make flying switch.
o +			—								
o +			—— 5 sec.	o o		o o o o					(—— 5 sec.) Signal for drawbridge.
o +											
o +			—— 5 sec.	o o		o o o o					
o +		o o o o o	—— 4 sec.								(—— 4 sec.) Signal for drawbridge.)
o +											(o o) Response to bell signal to stop at next station.
o +		— — o o						o o o o o			
o +		(—— o) 6 times		o o		o o o o	—— o o	o o o o o			(o——) Response to telegraph signal.
		(—— o) +									
o +										(—— o) +	
											[track; to be answered by (o o o).
	o +										
		o o o o o									(—— —— ——) For forward train to back, or to call in train from main
											" Irregular prolonged " sounds for cattle and to apply brakes.
o +											
o +											(o o) Response to bell signal to stop at next station.
					o o o o o				o o		
	o +	—— o o ——			o o o o						
o +	——									—— —— —— ——	
		—— o o ——									
	o +										
	o +										(o o o) Show engineer light from rear car. (—— —— —— —— ——) For
o +											[forward engine or train to stop.
o +	o +		—— 5 sec.	o o		o o o o			—— 5 sec.		
	o +							o o o o o			
o +											
o +				o o							
o +		6 times —— o	—— 5 sec.	o o				o o			
					o o o o o						
o +											
o o o o o o +	——	—— o	—— 5 sec.	o o				o			
o +	o +										[engineer to conductor to know if all is right and rear lights in position.
	o +										
o +		—— —— o o		o o				—— o			(o o) Response to bell signal to stop at next station; (o o o o) Signal from
o +				o				o			
			—— 5 sec.	o o		o o o o					—— 5 sec. Drawbridge signal.
o +			—— 5 sec.	o o		o o o o					
o +											
o +	o +		—— 5 sec.			o o o o					(o o) Response to bell signal to stop at next station. (—— 5 sec.) Signal
o +				o o							(o o) Engineer's notice to stop train. [for drawbridge.

indicated by the preceding sign or signs; "2 sec.," "8 sec.," &c., affixed to —— indicates the duration of the long sound.

o o o o; o o o o; o o o o o; o o o o; o o o o o o; o o o o o; o +..... 19

—— 4 sec.; —— 5 sec.; —— 6 sec.; —— 8 sec.; —— ——; —— —— ——; —— —— —— ——; —— —— —— —— ——; —— +..... 19

——; —— o o; —— o ——; —— —— o; —— — — o o; —— o o ——; o o o ——; —— o o o o; —— o o o o o; —— —— —— o o; —— o —— o —— o; (o ——) +; (——o) +... 16

TOTAL..... 40

and the through travel (which, however, may not include Buffalo-Albany passengers) but 16.4 per cent. of the whole. The Canada Southern, possibly the Great Western of Canada, and some of the Ohio roads are probably the only ones which have so large a proportion of their traffic affected by low through rates as suffers from them on the Michigan Central.

The resolutions of the board do not inform us what the net earnings of the quarter were, only that they were less than 1 per cent. "Net earnings" here, of course, must mean the surplus of net earnings over fixed charges. One per cent. on the stock is $187,382; the *average* quarterly surplus available for dividends in 1880 was $435,800. The earnings of this road from through east-bound freight alone in 1880 were about $640,000 per quarter, and the lower rates this year, in spite of the 60 per cent. more carried, would reduce the gross receipts of this branch of the traffic to $512,000. For two months of the quarter there was such a reduction of west-bound rates (on traffic received from the trunk lines) as must have taken about 28 per cent. from the gross earnings from this branch—whatever they were. An average of 6,454 through passengers were carried east and 5,491 west per month last year. The reduction in the rates between New York and Chicago and Boston and Chicago fortunately does not apply to all this traffic; if it did the losses on this traffic would be very large, this company's proportion of the Chicago-New York rate being but about $1.50 now against $6 when full rates are collected. But the accumulation of losses from these different branches of through traffic makes it easy to understand why the surplus for the quarter should be reduced from $430,000 last year to less than $187,000 this year, which means a reduction of net earnings from about $856,000 to something less than $613,000; for $426,000 per quarter is required to meet the fixed charges. Indeed, but for a heavy local traffic it would not have been surprising if the surplus over fixed charges was not only less than 1 per cent. on the stock, but absolutely nothing. But the lowest rates did not extend through the whole quarter—lowest on east-bound freight for the whole, on west-bound freight for two-thirds of it, on west-bound passengers from New York to Chicago for five-sixths of it, on east-bound passengers from Chicago to New York and Boston for less than one-third of it; so we have not yet seen the worst that the current through rates can do for this road: they need to last a whole quarter to exhibit that. Stockholders generally, however, are probably willing to dispense with any further evidence as to the effect of these rates on their profits.

The Lake Shore makes its usual 2 per cent. dividend for this quarter, but the Lake Shore last year had profits equal to 2.82 per cent. dividends quarterly, and had an undivided surplus equal to 3.28 per cent. on the stock from the profits of that year. It need not have earned this 2 per cent. dividend within the quarter in order to be able to pay it, and pay it properly. Doubtless, however, it had considerable profits then. It has some important and quite profitable traffic which the Michigan Central does not enjoy, and the numerous large towns on its line give it a vast local traffic, which in times like these may be very profitable, though the rates on a considerable part of its local freight must be affected by the low through rates.

Pacific Railroad Through Traffic.

The amount of through freight over the Central Pacific Railroad in 1880 is reported by that company to have been 279,219 tons, or an average of 446 tons each way daily, which is an increase of no less than 27 per cent. over the through freight carried in 1879. The leading items of through freight in the two directions were as follows, in tons:

East-bound.	1880.	1879.	Inc. or Dec.
Barley and grain	29,848	13,282	I. 16,566
Fruit	8,024	7,561	I. 463
Salmon	7,548	4,791	I. 2,757
Tea	11,736	10,070	I. 1,666
Wine and brandy	5,380	3,900	I. 1,480
Wool	15,235	19,026	D. 3,791
Total	77,771	58,630	I. 19,141
West-bound.			
Agricultural implements	4,028	4,671	D. 643
Ale, spirits and wine	7,748	6,402	I. 1,656
Canned goods	3,609	1,517	I. 2,092
Dry goods	13,009	9,921	I. 3,088
Hardware	1,860	2,493	D. 633
Iron, steel and iron pipe	5,522	7,203	D. 1,681
Machinery	2,400	2,244	I. 156
Nails	3,596	3,463	I. 133
Petroleum	11,735	8,809	I. 2,926
Fruit	1,186	518	I. 668
Paper	4,610	3,934	I. 676
Sugar	2,937	2,277	I. 660
Syrup and molasses	2,358	756	I. 1,602
Tobacco	4,478	3,255	I. 1,223
Wagons, carriages and materials	4,463	4,279	I. 184
Railroad materials and equipments	43,765	189	I. 43,576
Total	117,306	64,931	I. 52,375

This accounts for most of the east-bound, but for a smaller part of the west-bound freight, which latter is composed of a much greater variety of articles; the number of pounds carried of 140 different ones is given in the report. But out of the total of 279,219 tons of through freight carried last year, this accounts for 185,077 tons. The total eastward shipments were 99,286 tons, leaving 178,933 tons as west-bound freight—a striking contrast to the course of traffic on this coast, and due to the fact that the Pacific coast ships little but coarse products, which go chiefly by sea, while it receives its merchandise, like the rest of the country, chiefly from the East and by rail.

The largest item in the east-bound freight in 1880 was barley; the year before it was wool. The barley goes chiefly to Western breweries. The percentages of the total eastward shipments formed by the leading articles in 1880 were: Barley, 20; wool, 15.3; tea, 11.9; fruit, 8.1; salmon, 7.6; wine and brandy, 5.4. California barley is of a very superior quality, and there would be a market for millions of bushels of it on this coast if the cost of transportation were not so great. Cargoes have been shipped around Cape Horn to New York, and thence by rail to Milwaukee; but the best prospect for a steady demand for it is in the extreme Western states and territories, which must import beer if they have no breweries; and, in many cases must bring their barley, if they have breweries, either from the East or California.

The tea shipments are really considerable—for tea—but they average only 37½ tons a day—less than four car-loads; which will not be much of a bonanza to divide with the Northern Pacific, the Atlantic & Pacific and the Southern Pacific. It is, too, we believe, carried at much less than the average through rates, the competition of the vessels through the Suez Canal forcing down the rates on all Asiatic goods.

The gross earnings of the road from through freight in 1880 were $2,633,127, which is but 12¾ per cent. of its total earnings. It should be said, however, that the through earnings are from less than 900 miles of road, while the local earnings were from a mileage averaging about 2,500, a large part of which now forms a part of the new through line through Arizona and New Mexico. The through freight earnings were at the rate of $9.44 per ton, or 1.15 cents per ton per mile, which is anything but a high rate. The local freight, which is not so much greater in ton mileage than the through (265,747,212 ton-miles local, against 229,099,120 through), earned four times as much money, or $10,612,730, being at the rate of very nearly 4 cents per ton per mile (exactly 3.9935 cents). This is but another evidence of what we have often repeated, that the through traffic, and especially the through freight, of the Pacific coast is not sufficient to justify the building of any more railroads to carry it, but that the new lines must depend chiefly or almost wholly upon their local traffic—much more so of course than the existing line, because it gets the whole of it, and no new one will be likely to get as much as half of it. The new one lately opened gets substantially none of the through freight, we believe, and but a small fraction of the through passengers. Estimating the cost of passenger and freight trains to be the same per mile run (173.7 cents), the average *expense* per ton per mile is 1.63 cents, against an average receipt of 1.15 cents on through freight. While the expense on through freight is likely to be much less than the average expense, yet the margin of profit on this through freight must be comparatively small.

The through passenger traffic we commented upon a few weeks ago. It formed in 1880 less than one-third (30 per cent.) of the total passenger mileage, and earned 27¾ per cent. of the total passenger earnings, the average fare received per through passenger being just about $25, or at the rate of about 2.83 cents per mile—equivalent to about $54 per passenger between Omaha and San Francisco.

The whole gross earnings from through freight and passengers over the Central Pacific in 1880 were $4,249,387, and extended *pro rata* over the Union Pacific they would be something less than $9,500,000, or $5,000 per mile. A portion of this through traffic must be very profitable, but much of the through freight must be carried very nearly at cost. The distance is so enormous that many articles cannot afford to pay even the cost of transportation. The wheat exports alone of San Francisco last year were more than twelve times as great as the total through shipments east of the Central Pacific; and the Chicago shipments by rail eastward in a single week have been four-fifths as great as the year's through eastward shipments of the Pacific Coast, in this year when they were largest.

Diversity in Signals.

Mr. Hill's article on "Uniformity in Signals," which we published two weeks ago, is strongly reinforced by the great table issued with this number, showing the bell and whistle signals actually in use on no less than 198 American railroads. This table was compiled by Mr. W. F. Allen, C. E., for the *Official Railway Guide*, in the October number of which it appears, and to which we are indebted for permission to publish it thus early. Mr. Allen aimed to make this table complete for all the railroads of the country, and his position as editor of the *Official Guide* gives him great facilities for doing this, all the time-tables (which usually have the rules attached) coming to his office. There are probably a few more roads, whose systems may be included in a later issue of the table. No comment is needed to show the great diversity of signals; an inspection of the table is all-sufficient. And we hardly need add anything to what we have said so often before as to the desirability of reducing this diversity to uniformity. But as a further illustration of the dangers of the diversity which not only may be but actually are incurred, we may say that the train which recently conveyed President Garfield from Washington to Long Branch, and that which conveyed his remains back to Washington, was governed by *four* different signal systems. One engineer ran the train all the way. It was necessary for him at different points on his route to bring into his mind a new set of signals to govern the running of his train, and to banish from it the system on which he had just been acting, three different times. When we remember that the action following these signals ought to be in a manner instinctive, without the slightest interval for reflection, and that an error in obeying one may be followed by the direst consequences, we shall understand the importance of having a uniform system. In the case of the President's train, an engineer of the local road could accompany the one who ran the train; but there are cases, and numerous ones, where the same engineer has to be governed by two sets of signals every day, as he passes with his train from a line owned by one company to that owned by another. And a large proportion of such cases are in cities and at or near termini, where there are frequent trains and complicated tracks, and consequently much signaling.

There is a similar complication in the hand and lantern signals, which will be discussed in these columns soon in another article by Mr. Hill. The whole subject has such pressing practical importance that we hope to see it thoroughly discussed and kept alive until some action is taken. The enormous difficulty of getting the railroads to unite in any action must not be forgotten, but this is a matter which justifies protracted agitation and the overcoming of all the obstacles that lie in the way.

August Accidents.

Our record of train accidents, given elsewhere in full, shows for the month of August 129 accidents, whereby 31 persons were killed and 67 injured.

Of these accidents, 21 caused the death of one or more persons, and 19 caused injury but not death, leaving no less than 89, or 69 per cent of the whole number, in which no serious injury was recorded.

As compared with August, 1880, there was an increase of 17 accidents, but a decrease of 18 in the number killed and of 147 in that injured.

The number of killed and injured was remarkably small compared with the number of accidents. By far the larger part of them were railroad employés.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear collisions	42	
Butting collisions	20	
Crossing collisions	3	
		—65
DERAILMENTS:		
Broken rail	3	
Broken wheel	1	
Loose wheel	1	
Broken axle	2	
Broken bridge	3	
Spreading of rails	1	
Wash-out	4	
Accidental obstruction	6	
Cattle on track	6	
Misplaced switch	11	
Purposely misplaced switch	1	
Malicious obstruction	3	
Unexplained	18	
		—60
Boiler explosion	1	
Broken connecting rod	2	
Broken wheel not causing derailment	1	
Total		129

Seven collisions were caused by mistakes in sending or receiving orders, or by failure to obey them; six by trains breaking in two; three by misplaced switches; two by fog; one each by a broken engine, by carelessness in side-tracking cars, and by failure to use signals properly. Of the very large number of collisions about two-thirds are unexplained.

Of the three broken bridges one had been partially burned through by an accidental fire and so weakened. Of the other two we have no particulars except that they were wooden bridges, and both were of small size.

A rough classification of causes of accident shows that 7 resulted from defects or failures of road; 16 from defect or failure of equipment; 6 were caused directly by the elements or the weather; 11 by accidental obstructions; 67 by

carelessness or defective management; 4 were maliciously caused and 18 were unexplained.

Experience shows that the larger part of the unexplained derailments are due to defective track. Speaking as nearly as is possible from the information at our command, it is not too much to say that two-thirds of these accidents could and ought to have been prevented.

A division according to classes of trains and accidents may be made as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains	4	20	4	28
To a pass. and a freight	14	..	..	14
To freight trains	47	40	..	87
Total	65	60	4	129
Casualties:				
Killed by	19	11	1	31
Injured by	36	27	4	67
Total	55	38	5	98

The record shows that 72 accidents happened in daylight, 52 at night, and in five cases the exact time is not given.

The three summer months ending with August have been noted for the large number of accidents, but have been fortunately free from any of those wrecks of excursion trains which in previous years have caused so much death and suffering. The figures for the three months, as compared with last year, are as follows:

	1881.			1880.		
	Accidents.	Killed.	Injured.	Accidents.	Killed.	Injured.
June	73	31	78	56	15	77
July	102	38	122	78	21	100
August	129	31	67	112	49	214
Total	304	100	267	246	85	391

In the month of August we have usually had to record a large number of accidents, and for this there are several causes. August is generally a month of large freight traffic and also of large and exceptional passenger traffic, when many extra and excursion trains are run and any slight derangement is apt to cause trouble. It is also a month when sudden and severe storms may be looked for, when washouts and similar accidents may be expected, and the roadbed is liable to be injured at unexpected points. This year the conditions have been changed so far as the weather is concerned. Almost all over the country the month has been one of extraordinary drought, and there have been few or no severe storms, except in the far West. The roads have been free from disturbance by the elements in a very unusual way. On the other hand traffic has been everywhere very heavy. The number of trains on most roads has been large and many have been worked almost to the full capacity of their equipment. Employés have generally been worked very hard and under conditions of atmosphere and temperature peculiarly exhausting, so that it is not strange that some of them should have given way under the strain.

The accidents on the record are very much as we should expect to find them under such conditions. Wash-outs, land slides and similar causes of accident are few, while collisions are very many, being over half the whole number of accidents—a larger proportion than we can now recall in any month of this record.

The two most prominent causes of collision were the practice of running sections of freight trains too close together for safety, and the breaking of couplings. The latter is a very fruitful cause of trouble, and the accidents here given are only a small part of the failures which occur. In a great many cases such breaks cause only delay and not accident, and in many others slight accidents which escape record and are never heard of.

Misplaced switches appeared last month in large numbers, no less than 14 accidents, three collisions and 11 derailments having been caused by them.

Train-wreckers were unusually active; they caused three derailments by obstructions on the track and one by a misplaced switch; we have heard also of several unsuccessful attempts, where accident was prevented by the vigilance of trainmen.

For the year ending with August the record is as follows:

	Accidents.	Killed.	Injured.
September	124	15	54
October	120	69	137
November	145	40	165
December	135	29	141
January	223	30	182
February	149	27	253
March	113	38	177
April	63	22	66
May	85	24	76
June	73	31	78
July	102	38	122
August	129	31	67
Totals	1,461	394	1,518
Total, same months, 1879-80	891	239	954
" " " 1878-79	841	196	758

The averages per day for the month were 4.16 accidents, 1.00 killed and 2.16 injured. For the year they were 4.00 accidents, 1.08 killed and 4.16 injured.

The average casualties per accident were, for the month, 0.240 killed and 0.519 injured; for the year, 0.270 killed and 1.039 injured.

The averages per month for the year were, 122 accidents, 33 killed and 126 injured, against similar averages of 74 accidents, 20 killed and 80 injured in 1879-80, and 70 accidents, 16 killed and 63 injured in 1878-79. This year's averages are very much higher than those of the other corresponding years.

August Earnings of the Pennsylvania Railroad.

Pennsylvania Railroad earnings and expenses have just been reported for August and for the first eight months of the year. For August there is, compared with last year, on all the lines east of Pittsburgh and Erie, an increase of $86,629, or 2.3 per cent., in gross earnings, an increase of $196,599, or 9.1 per cent., in working expenses, and a decrease of $109,976, or 7.1 per cent., in net earnings. The gross and net earnings and expenses in August for nine successive years have been:

	Gross earnings.	Expenses.	Net earnings.
1873	$3,416,271	$2,257,910	$1,158,361
1874	3,303,031	2,137,747	1,166,184
1875	3,220,665	1,939,587	1,281 078
1876	3,205,022	1,707,565	1,597,457
1877	2,783,115	1,609,097	1,174,018
1878	2,972,601	1,485,950	1,486,651
1879	2,982,718	1,725,718	1,257,000
1880	3,723,355	2,168,873	1,554,482
1881	3,809,978	2,365,472	1,444,506

Thus the gross earnings this year were larger than in any previous year, but so were the expenses, and so much larger that the net earnings were smaller, not only than last year, but also smaller than in August in 1878 and in 1876. The gross earnings in August are larger than in July (which is usually the case), and have been exceeded in only two months of this year, March and May, and only in October of last year, and in no other month since October of 1876.

The smaller net earnings need no explanation. For the gross earnings to have been so large there must have been a very heavy traffic, since through freight rates in both directions were only about one-half as high as last year throughout the month, and an important portion of the through passenger business was carried at a still greater reduction from last year's rates.

The amount of earnings on the lines west of Pittsburgh and Erie is not reported, but for the eight months ending with August the surplus of the net earnings of these lines over their liabilities is $2,160,087, which is $285,540 more than last year at the same time. At the end of July the gain was but $146,380 over last year, showing that the surplus profits increased $139,160 in August last, against a decrease of $138,296 in July, and of $103,277 in June. This result surprises us somewhat, as the indications had been that these Western lines suffered more in proportion than the Eastern ones from the low through rates, and, moreover, a large part of these lines are where an exceptionally heavy wheat crop gave them a heavy August traffic last year, and an unusually light crop this year was likely to reduce it materially. As it is, the loss of $109,976 in the net earnings of these lines east of Pittsburgh and Erie is more than made up by this gain of $139,160 in the profits of the lines west of those places; so that the total profits of the Pennsylvania Railroad Company were a little larger this year than last in the month of August.

For the eight months ending with August the gross and net earnings and the working expenses of all the lines east of Pittsburgh and Erie have been for five years:

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$18,999,848	$12,617,050	$6,382,798
1878	19 961,272	12.077,660	7,883,612
1879	21,179,685	13,077,215	8.102,470
1880	26,606,074	15,654,678	10,951,396
1881	29,143,240	17,2.0,607	11,9.2,633

Thus the gross earnings this year, which were 9½ per cent. more than last, were 36 per cent. more than in 1879, and 53 per cent. more than in 1877; and the net earnings this year, which are 9 per cent. more than last year, are 47 per cent. more than in 1879 and 87 per cent. more than in 1877. To the gain of $981,237 in net earnings over last year must be added the increase of $285,540 in the profits of the lines west of Pittsburgh and Erie, making a total gain of $1,286,777 in the profits of the company, which is about 1⅝ per cent. on the total stock, including that issued on account of the purchased Philadelphia, Wilmington & Baltimore Railroad.

That this road should be able to make so good a showing in a month of so severe and extensive a railroad war is evidence of the great richness of its local traffic. Its losses on through freight in July and August compared with last year, taking all the lines, both east and west of Pittsburgh, we should estimate at something more than a million, and this has all been made up and more than made up by the growth of other traffic.

But, under the present circumstances—that is, with the present through rates—we cannot expect hereafter a growth in net earnings over the very large ones of last year, but rather a decrease, as there was on the lines east of Pittsburgh and Erie in August. The course of gross earnings from month to month this year and last has been:

	1881.	1880.	Increase.
January	$3,189,215	$3,083,551	$105,664
February	3,095,594	2.944,576	151.018
March	3,844,304	3,278,186	566,118
April	3,760,372	3,488,366	272,006
May	3,856,897	3,417,916	438,081
June	3,807,436	3,221,475	585,961
July	3,780,418	3,449,644	330,774
August	3,809,978	3,7[illegible]8,355	86,623
September		3,647,544	
October		3,882,714	
November		3,574 913	
December		3,547,827	

Thus the increase in August was smaller than in any other month of this year, and little more than a quarter as great as the July increase. This was partly because the August receipts were extraordinary last year, but the receipts of all the later months were also very large, and the fall months for four successive years heretofore have had a large traffic at good rates. We do not believe that it will be possible now, even with perfect harmony among the railroads, to make the *through* traffic for the rest of the year yield as much as in the corresponding months of 1880 and 1879, but with the larger local traffic if through rates are restored the total earnings may very likely be made to equal or exceed those of the corresponding months of last year.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Mobile & Ohio.—Extended northward to East Cairo, Ky., 2½ miles. Gauge, 5 ft.

Northern Pacific.—Extended from Spokane Falls, Wash. Ter., north by east to Lake Prescott, 58 miles.

Pennsylvania.—This company's *Philadelphia & Long Branch* line is extended from Sea Side Park, N. J., north to Bay Head, 8 miles.

Richmond & Allegheny.—Track laid from Holcomb's Rock, Va., to Big Island, 7 miles, completing the main line of the road.

Bradford, Eldred & Cuba.—Extended from Ceres, N. Y., northeast to Wellsville, 21 miles. Gauge, 3 ft.

California Southern.—The first track is laid from San Diego Bay, Cal., northward 5 miles.

Chicago, Milwaukee & St. Paul.—The *Iowa & Dakota Division* is extended west to Chamberlain, Dak., 50 miles. The *Hastings & Dakota Division* is extended westward to Aberdeen, Dak., 31 miles. The *James River Branch* is extended from Melette, Dak., south to Ashton, 9 miles, and from Aberdeen northward to Frederick, 42 miles.

New Orleans Pacific.—Extended from Mansfield, La., southeast 66 miles.

This is a total of 299½ miles of new railroad, making 4,774 miles this year, against 3,607 miles reported at the corresponding time in 1880, 2,214 miles in 1879, 1,267 miles in 1878, 1,396 miles in 1877, 1,677 miles in 1876, 804 miles in 1875, 1,101 miles in 1874, 2,778 miles in 1873 and 4,970 miles in 1872.

LAKE RATES during the week ending with Wednesday last fell materially. The week before they had been nearly stationary at about 3½ cents a bushel for corn and 4 for wheat from Chicago to Buffalo. Now they have declined until Tuesday's quotations were 1½ to 2 cents a bushel for corn, wheat being not more than a quarter of a cent higher, and Wednesday the telegraph reported 1 cent a bushel as the rate on corn—lower than ever before. At these rates shipments are very light, and some vessel-owners, it is said, contemplate laying up their vessels now rather than wait for the close of navigation. Yet very remunerative rates are obtained for carrying coal from Buffalo to Chicago: they had been for some weeks $1.10 a ton and this last week they advanced 5 to 10 cents. A ton of coal weighs the same as 40 bushels of corn, and is loaded and discharged by the shipper and consignee, without expense to the vessel. With these high rates on coal (in previous years half as much has been considered a good rate), the vessel ought to be able to accept very low rates for down cargoes. The present grain rates, however, are lower than were ever known before at this season, and 1½ cents a bushel is as low as the lowest ever made at any time. At this time last year it was more than twice as great (3¾ to 4½ cents on corn during the week ending Oct. 2), but this was lower than it had been and it soon rose to 7 cents. The cause of the reduction during the past week is doubtless reduced shipments. Heretofore for some time the receipts of the lake cities have been, considering the crops, extraordinarily large. Shipments have not been so large, but too large for the railroads to carry; and what they were unable to handle the vessels have got at rates higher than the rail rates. A comparatively small reduction in the shipments, when the railroads continue to carry at 12½ cents per 100 lbs. or so, leaves too little to supply all the vessels with cargoes.

Canal rates, which for some time had stood at 4½ cents a bushel for corn and 5 for wheat from Buffalo to New York, and last week were larger in amount than for three months before, fell Tuesday to 4½ and 4, which is not sufficient to induce all the boats to take cargoes. Probably speculation in the West has affected the shipments, and consequently the lake and canal rates, as well as other causes. At this time last year the canal rates were 5½ and 6 cents, and canal shipments were very large. Then the through lake and canal rate was 10½ cents a bushel for corn, against 6 cents now; but then the through rail rate was 16.8 cents, and now it is but 7 to 8.4 cents.

Ocean rates are also lower and have been generally for a week, late quotations having been 2½d. a bushel for grain by steam from New York to Liverpool. A week ago the rate was 3d., and a year ago it was 5½d. The cost of transportation by water from Chicago to Liverpool is now about 11 cents a bushel for corn (plus the New York transfer). Last year at this time it was 21½ cents. Yet the grain can much better bear a high rate this year. Corn in Chicago is 69 cents a bushel now, against 40 cents last year, and No. 2 spring wheat is $1.35, against 92 cents last year.

THE DECREASE IN TOLEDO GRAIN RECEIPTS is one of the most marked features of the Western grain movement this year, and especially since spring. Attention is called to it just now by the very small receipts of the week ending Sept. 17 this year, which may very likely be exceptional. In this week its receipts were 321,000 bushels, against an average of 803,000 in August of this year, and of 1,020,000 in September of last year. Down to this time (Sept. 17) last year Toledo had received 23,975,000 bushels of grain; this year but 18,200,000—a decrease of 8,775,000 bushels, or 32½ per cent., against a decrease in the aggregate of the other seven ports of 7,000,000 bushels, or 4½ per cent. Last year from June till December Toledo receipts averaged 1,090,000 bushels a week, and from June to Sept. 17 1,150,000 bushels; while this year for the latter period they have averaged 590,000 bushels, or but about half as much. Taking the aggregate receipts of the eight reporting Northwestern market *since June*, and comparing those of Toledo with those of the other seven for this period, we have:

Receipts—	1881.	1880.	Inc. or Dec.	P. c.
Of 7 markets	66,097,644	65,583,034	Inc. 514,610	0 8
Of Toledo	6,505,738	12,648,576	Dec. 6,14[illegible],788	48.6

Thus, while the rest of the Northwestern markets have had, in the aggregate, as much as last year, Toledo has had little more than half as much in this period, during which

the new wheat has been coming forward. The other seven markets have not all fared alike, it is true, but at none has there been so great a change as at Toledo While it lost 6,000,000 bushels and 48 per cent., St. Louis had a decrease of 1,900,000 (15¾ per cent.), Cleveland a decrease of nearly 1,000,000, and Duluth one of 630,000; but Chicago an increase of 2,300,000 bushels, Milwaukee one of 1,300,000 (56 per cent.), and Peoria one of 700,000. The bad crops we would expect to tell most on St. Louis, Toledo, Cleveland, Detroit and Peoria receipts, but Peoria gains greatly by low rail rates. Detroit receipts are nearly the same as last year. Toledo receives chiefly from the country which has suffered most from winter-killed wheat and drought this year; but we should not expect to see so great an effect from this so early in the season; for Toledo's receipts are largely corn, and the new crop will not be shipped until next January. But with the prospect of a very short new crop the shipments of old corn would be greatly reduced, as the farmers would hold for their own consumption. The smaller Toledo receipts, however, may be due partly to the shipments of a larger proportion of the grain to Chicago or St. Louis from the southwestern district which supplies it. The Wabash has this year a line into Chicago which it did not have last year; but we do not hear that it makes large grain deliveries there.

THE PHILADELPHIA & READING RAILROAD is reported to be desired by Mr. Vanderbilt, as an offset to the Delaware, Lackawanna & Western, which will soon have a road of its own to Buffalo. There is reason why the New York Central should desire connection with a coal road, in order to carry coal shipments to Buffalo, but the importance of this traffic would hardly justify the acquisition of a company of $150,000,000 of capital, like the Reading—$20,000,000 more than that of the New York Central itself. The anthracite traffic is much less important to the New York Central than to the Erie or the Pennsylvania. There is a great deal of it, but it cannot reach Buffalo by the New York Central without taking an indirect route, and then the Central does not get a great deal out of it. At present it takes the Delaware, Lackawanna & Western coal at Syracuse, which is only 150 miles from Buffalo, and the distance by this route from Binghamton, where the Lackawanna crosses the Erie, is 230 miles, while by the Erie it is 208 miles. The Erie can send its grain cars to the mines for coal, to be sent westward; this is too far out of the way for the Central, which has the coal transferred from coal cars to its grain cars at the junction. The relative importance of the coal traffic on this road and the Erie may be seen from the fact that during the year ending with September, 1880, when it was largest on the Central, it carried 1,640,000 tons, while the Erie carried 4,067,000 tons, and the year before 4,410,000 tons. The Central's earnings from this traffic are not reported separately. On the Erie in 1879-80 they were nearly $3,200,000, and 0.738 cent per ton per mile. If the earnings per ton per mile were as great on the Central (they were probably less) they could not have been more than $1,900,000. But a very large part of the Central's coal tonnage is to towns on its own line, which have a very large aggregate population; and this will not be reduced by the diversion of the Lockawanna's coal to its new road, which does not pass through New York Central stations. Nevertheless, the through coal traffic is worth something to the Central, and it is likely that it will seek and obtain a share of it.

A SETTLEMENT OF THE RAILROAD WAR is talked of in the newspapers, and there is no doubt that on Thursday of last week there was a conference of representatives of the trunk lines at which there was some discussion of the subject—a very encouraging fact, since a settlement can only be reached by negotiation, and theretofore there had not been the slightest disposition to propose terms of any kind. Strict secrecy is maintained as to what was broached at last week's meeting, but not as to the success of it. It is reported that there is no probability of any settlement on terms then considered; but then there is no reason to suppose that those terms, whatever they were, may not be modified; and at least the impression conveyed by those who know what was done is not that the case is hopeless; though little or no progress seems to have been made on that occasion. But in a case of this kind a settlement may be made at almost any time, as a very few people can conduct the negotiations and conduct them secretly, and their decision will be acceptable to all of the parties concerned.

CHICAGO RAIL SHIPMENTS EASTWARD have shown little variation for several weeks. The last for which a complete report is made is that ending Sept. 17, in which the total was 63,855 tons, and it had not varied a thousand tons from this for four weeks. For this week ending Sept. 17 the rail shipments last year were 33,844 tons, showing an increase this year of 30,011 tons, or nearly 89 per cent. From June 18 to Sept. 17, thirteen weeks, the shipments this year have been 806,801 tons this year, against 501,637 in the corresponding three months of last year—or 61 per cent.

Observations on English Railroads—The Great Shops at Crewe.

There is no place in England where a person interested in the mechanical engineering of railroads will find so much to observe as at Crewe, where the principal locomotive shops of the London & Northwestern Railway are situated. This line has a greater traffic and equipment than any other in Great Britain. The company owns 1,463 miles of road and, including lines partly owned, leased and foreign lines, it works altogether 2,444½ miles. It owns 2,315 locomotives, 5,590 "carriages, vans," etc., engaged in passenger service, and 46,305 "wagons" for merchandise traffic. The shops for the maintenance of such an equipment must evidently be very extensive; 5,617 men are employed in them. This number includes those in the steel works, in a large stone yard and in the signal works, but not in the carriage or wagon departments, which are at Wolverton and Earlestown.

The Locomotive Superintendent or Engineer is Mr. F. W. Webb, one of the most eminent men in his profession. He is assisted by Mr. T. W. Worsdell, whose name is well known in the United States, from the fact that for several years he was engaged in the machinery department of the Pennsylvania Railroad at Altoona. It is therefore possible to study English practice at Crewe with an American light shed on it through Mr. Worsdell's experience. Probably it has been in part due to this, that some features of American practice which differ from English usage have been adopted or tried on this line. Among these are cast-iron driving-wheel centres, of which a large number are now in use for "goods" or freight engines. Some time ago steel was also extensively introduced for fire-boxes, and it may be a matter of surprise to American master mechanics that it was found necessary to abandon its use entirely for that purpose and to return to copper for both the back tube and fire-box plates. It is true that fire-boxes were also made of steel on other English lines, but it was more extensively used on the London & Northwestern road, and it failed there with more emphasis, it may be said, because the steel used was made in the works of that company. Most if not all of it was Bessemer metal, which is not made into plates at all in the United States. It may be added that so far as the writer has been able to ascertain the opinions of locomotive superintendents here, they are unanimous in their condemnation of steel for fire-boxes. Its use has been entirely abandoned for this purpose on every road that has been visited. So far as the experience of those who used it could be learned, it seems that it was exactly similar to that of American master mechanics ten or twelve years ago. Any one who will read over the reports of the Master Mechanics' Association of that time will find that the experience of its members in this respect was then identical with that of British locomotive superintendents later. Steel for fire-boxes was then condemned by many, and in fact came very nearly being entirely abandoned; and had it not been that the manufacturers of steel plates recognized the evil, and also saw that unless it was remedied it would result in the loss of all demand for steel for this purpose, our experience and practice would doubtless have been the same as that of our English brethren, and we now should be using copper or perhaps iron where steel is almost universally employed at present. The manufacturers of steel boiler plates, however, instead of submitting to the loss of their business, went to work to improve their plates, and to make a steel which would stand the service for which it was intended. The same complaints were made in America at the time referred to that are made in England now. Our steel failed then by cracking in the most mysterious way. Sometimes plates would fail while the engine was at work; at other times hours, and even days, after the fire was drawn would crack with a report as loud as that of a rifle. The fractures, it was noted, generally occurred in the sides of the fire-boxes, and were always vertical, although they would often radiate from the stay-bolt holes. All kinds of remedies were proposed. The manufacturers at one time urged that the holes should all be drilled and that the plates after flanging and drilling should be carefully annealed. In fact at one time it seemed as though steel would require to be treated so very tenderly that that fact alone would prohibit its use. Corrugated plates for fire-boxes were proposed, and on one or two lines were much used. After a great deal of experiment and experience, though, the manufacturers were able to furnish a material which would stand without taking any of these precautions, excepting perhaps that of annealing the plates after flanging, and now steel fire-boxes are almost universally used on American locomotives. Unfortunately, at this distance from the statistics, it is impossible to give any data concerning the durability of steel, nor are the requisite figures at hand to compare the cost of steel and copper. Probably no more useful piece of work could be done for English railroads than to collect such information, and show, if possible, the reasons why steel will stand the service in fire-boxes in America and will not in England. The fact that, as a general thing, we work our locomotives harder than English engines are worked here, and that our coal has more injurious impurities in it, all seem to be unfavorable conditions. It has been said in England that one of the reasons why steel stands in American engines is that they are kept fired up more continuously than English engines and are thus not exposed to such frequent changes of temperature. It would probably not be difficult to show that steel fire-boxes do stand in engines which are fired up and cooled off daily. The only unfavorable condition for steel under which English engines work is that the furnace doors used here are usually kept open, which exposes the plates to currents of cold air; but this condition often exists in American engines, although perhaps not so continuously as here.

The steel works at Crewe already referred to consist of a number of Bessemer converters and Siemens-Martin furnaces for the manufacture of plates, rails, etc. The fact that the company makes its own steel, and that it can thus produce plates of that material cheaper than it can either buy or manufacture iron plates, has led to the use of the former material for almost all purposes, excepting for fire-boxes. For tanks, chimneys, ash-pans and in fact wherever iron plates are ordinarily used, steel is substituted at Crewe. A great deal of work is done by shaping steel plates in dies and formers, and some very complicated forms are thus worked out by means of various ingenious devices which are used. Thus the base of the chimney, by which it is fastened to the smoke box, instead of being a heavy casting, is made of a square plate of steel with a hole punched in the middle. It is then heated and placed under formers, so as to draw out the metal around the hole with the form required to attach it to the chimney. By this means they are made very quickly and cheaply, and of course do not weigh a fourth as much a they would if made of cast iron.

The domes of English locomotives are always placed about midway between the fire-box and smoke-box and instead of being attached directly to the barrel of the boiler, as they are with us, usually have a base made of wrought iron with a bottom flange shaped to the curve of the boiler, so as to be riveted to it. This base is usually from 6 to 10 in. high, with another flange on top, to which a similar flange on the dome is bolted. As the flanges are usually about ¾ in. thick, it will be seen that it is a difficult thing to make. In some shops it is made of a heavy piece of angle iron bent into a circle, and the ends welded together, the sides being drawn down to the shape of the boiler. At Crewe a round steel plate an inch or more thick is taken, and a hole is then punched in the centre. After being heated it is bent to the shape of the boiler and a neck is drawn out by forcing a die into the hole, and drawing the plate to the shape of another die of the requisite size. After this process, and another heat, the upper flange is turned and the job is complete. Mud-drums and other parts are made in a similar way.

A very interesting process is that of making the outside casing or covering for the domes of locomotives. Those on English locomotives, as most of the readers of the *Railroad Gazette* know, are made very plain, the top being a perfect hemisphere, the sides a cylinder and the base or lower edge is drawn out or flared in a kind of a trumpet-mouth shape, so as to unite by easy curves with the barrel of the boiler. These casings are made of two soft steel plates of about No. 14 wire-gauge thickness. It is thus composed of two pieces, which are united in a vertical plane through the centre of the dome. The two halves are first shaped in formers to that of one-half of the finished casing. The edges are then serrated, somewhat like very large teeth of a saw. These are then bent alternately on one side and on the other, as the teeth of a saw are "set." The edges are then brought together so that the teeth will interlock with each other, and they are then brazed together and the projecting portions of the plates are filed off or hammered down so as to be flush on the outside. The whole is then painted.

Steel, about ⅛ in. thick, is also used for the covering of the lagging of the boiler.

The lagging is put on in a somewhat novel way. The material used is heavy felt. As has been found elsewhere, this burns, or rather, chars, very rapidly. To avoid this it is therefore laid on a kind of frame-work, or, as it is called at Crewe, a crinoline, made of angle and light strap iron, which leaves an air space of an inch or two between the boiler and the felt, thus effectually protecting the latter. Light boards and the steel casing are then put on the outside of this.

As stated before, the shells of boilers are all made of steel on this line, about 7-16 in. thick. The longitudinal seams are butt-jointed, with two rows of rivets, that is, one row on each edge of the plate. The circumferential seams are ordinary lap-joints, single-riveted. Rivet holes and tube holes are punched. Great care is taken to locate all the horizontal seams above the water line. Before the plates are lapped on each other the scale is carefully removed under the laps by an application of sal ammoniac and water, so as to bring the metal in contact. The boilers are tested before calking, first with a steam pressure of 60 lbs., and afterward with a hot-water pressure of 250 lbs, to see whether there are any defects in the riveting. It is then calked under a steam pressure of 60 lbs., first with a flat, and then with a round-nosed tool. The steel of which the boilers are made is tested by bending a cold test pin double after being plunged hot into cold water, and also extending a ¾-in. hole to 1¾-in diameter by driving a drift into it. The riveting, excepting in a few inaccessible places, is done by a hydraulic machine. This method is used in England almost universally for riveting.

Mr. Webb has designed a very neat furnace door which opens inward so as to form a deflector for admitting air to the fire. It is operated by a lever on the outside. The deflector is made of cast steel to resist the heat. As a drawing of it for the *Railroad Gazette* has been promised, further description is here omitted.

The galvanizing of steel plates, and many other iron parts exposed to corrosion, is very much used at Crewe. Parts of tanks, etc., which corrode rapidly are all galvanized, and the process is also employed for the iron used for operating signals out of doors. This is all done in the works at Crewe.

In making the seams of tanks a thick piece of paper, resembling cartridge paper, is placed between the plates, and is riveted up between them. This, it is said, makes a better joint than can be formed by the usual method.

The crown-sheets of the boiler are stayed with bars and sling stays, connected with the outside shell of the boiler. The mud-ring, or "foundation-ring," as it is called here, is made deep enough at the corners to take two rows of rivets. This is done to strengthen the plates in the corners, which are such fruitful sources of corrosion and trouble.

In making and fitting ash-pans, Mr. Worsdell says, much more trouble is taken at Crewe than in America. They are made of 5-16 steel, strongly braced, and with a damper in front. The latter is fitted to the pan, and the pan to the

fire-box so as to make them as nearly as possible air-tight. The object of this is to be able to regulate with some accuracy the admission of air below and above the fire, on which the authorities at Crewe think much of the success in consuming smoke depends.

In connection with the steel works Mr. Webb is also using the process of steel casting very extensively. The castings are made of Siemens-Martin steel just as ordinary castings are, the only difference being that the molds are lined with a more refractory material (composed chiefly of clay and plumbago) than is used for ordinary iron castings.

In the steel works and in the blacksmith shop a great variety of methods is employed for forging both under dies and by stamping or rather punching out of a solid piece the form of the article required. It would be difficult to explain how this is done, without going into much more detail than is now possible. The dies used consist usually of a pair of cast-iron blocks, one of which is attached to the head of a steam-hammer, and the other to its anvil. The form of the article is cast or cut in this casting, so as to form, as it were, a mold of it, as though it was to be cast, one-half the mold being in the top die and the other half below. A piece of iron approximating the form of the article to be formed is heated and laid between these dies, and a single blow of the hammer usually completes it. Complicated forms often require several processes, and means of upsetting and squeezing into different shapes must be adopted, which must, of course, vary with the shape and size of the article to be made.

The reverse process is also often used in forging; that is, instead of the object being pressed into the shape required the superfluous material is punched or cut away, thus leaving the form required. This is done under steam hammers, especially for steel forgings.

At Crewe may also be seen a method of applying heat, and another for applying power, which as yet are unknown or very little used in American shops. These are, first, the gas furnace, and second, hydraulic power. The first is used in heating plates, etc., for flanging, shaping, etc. All the springs are made in gas furnaces, for which it is admirably suited. Another very convenient application of it is in brazing on the ends of brass tubes. It is simply a small fire-brick receptacle for the tube, so as to confine the heat imparted to it with a vertical Bunsen-burner, which throws a very highly heated flame, produced by the combustion of a mixture of gas and air, downward upon the tube. A boy turns the tube slowly in its fire-brick bed, and adds the requisite brazing materials, and the work is done.

The other agent of applying power is now used for such a diversity of purposes in England that an American is at first surprised to find how far we are behind our English brethren in this respect. There are, of course, some reasons for this, the principal one being that, until recently, the work which could be done in this way was not sufficiently concentrated to justify the required expenditure. This condition of things has changed and will continue to change, so that these appliances could now, in many cases, be used with very great advantage. Reference has already been made in a previous letter to the use of hydraulic cranes, capstans, etc., in shops and stations. In the Crewe shops the riveting machines, spring testers and presses of various kinds are operated by hydraulic power. In fact, wherever much slowly-acting power is required, there hydraulic pressure may be employed, and the variety of uses to which it may be applied is very much greater than any one would at first suppose.

The predominating type of locomotives used on the London & Northwestern line is one with inside cylinders and without trucks or bogies. About sixty engines, each with a single pair of driving-wheels and outside cylinders, are in use, but it is doubtful whether any more of that kind will be built. One of these, with driving-wheels 8 ft. 6 in. in diameter, with the barrel of the boiler below the driving-axle, was built some years ago by a former Locomotive Superintendent. The boiler has been altered and placed above the axle, but the engine is still running with the same wheels and cylinders. The latter are 17½ × 24 in. The other engines of this class have 7 ft. 6 in. wheels.

The passenger engine now most approved is one with four coupled wheels and a pair of leading wheels in front having a rigid axle. The frames are of the usual English plate type. The steam-chests are on the sides of the cylinders, the valve faces being of course vertical. The two cylinders and the steam-chest (one of the latter answering for both valves) are cast in one piece; special machines are used for planing the valve-seats and trimming out the ports. The space between the valve-seats is about 5½ in. Although it is said that with the special machines for that purpose, the work can be done nearly as quickly as it could if the seats were open, yet the operation looks very much like working in the dark. The freight or "goods" engines, as on all English roads, have six wheels coupled, with the same kind of cylinders as the passenger engines, and, of course, the attending crank shaft. The London & Northwestern Railway is, so far as the writer's observation has gone, the only line in England or Scotland that is using cast-iron driving-wheel centres. These are used, however, only on freight engines. Those for passenger engines, as is universally the case over the whole of Great Britain, are wrought iron. The use of solid-end coupling-rods with a circular bushing pressed in is almost equally common. It is a very rare thing to see a stub-end on a coupling-rod, especially on four-coupled engines. Iron cabs and six-wheeled tenders are also the almost universal rule.

Mr. Webb is now putting on the screw-reversing gear, and is also placing the injectors below the foot-board, and taching the check-valves to the back end of the boiler, with a pipe in the inside of the latter, extending to near the front end. The arrangement is very neat, and is deserving of general adoption.

Many things which were observed at Crewe must, however, be left unnoted, as space and time are both limited. The signal department is especially interesting. It may be said, though, that this branch of railroad art and science has been developed in Europe to an extent of which most American railroad officers are extremely ignorant. It is not alone that English engineers are using devices in signaling which are little known in the United States, but they have evolved a system of laws and principles which must govern all signaling in order to be safe, and which are not merely arbitrary rules, which may or may not be observed, but are of the same immutable nature as the one deduced from experiments on metals, which teaches us not to subject them to strains greater than their so-called limit of elasticity. The system of laws referred to, and the means used to apply them to practice, has been evolved in England after many years of experience, doubtless great sacrifice of life, much profound study, the exercise of the rarest ingenuity and the expenditure of millions of dollars of money. All, or very nearly all, the railroads of Great Britain are operated by signals constructed in conformity to the laws referred to. Everything that money, ingenuity, legislation and experience could do to perfect this system has been done; and although it would be folly to pronounce it perfect, yet what seems equally or more foolish is for men who are in almost total ignorance of what has been done here, to attempt to devise improved methods of signaling for American railroads. A visit to the signal department of the London & Northwestern Railway does not therefore foster the natural vanity of an American student of railroad appliances, and when he recalls the bumptious attempts at improvements in this direction, so often made by railroad men at home, and the dismal and almost hopeless condition of ignorance of this subject that many, or it might be said most of them, are still in, it does not stimulate him to much national exultation.

But further discussion of the subject must be postponed.

M. N. F.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Buffalo, New York & Philadelphia, annual meeting, in Buffalo, N. Y., Oct. 5, at 10.30 a. m.

New York, Pennsylvania & Ohio, annual meeting, at the office in Cleveland, O., Oct. 28, at 11 a. m.

Railroad Conventions.

The *Order of Railway Conductors* will hold its fourteenth annual convention in Buffalo, N. Y., Oct. 4.

The *Southwestern Railway Association* will hold a called meeting in Chicago, Oct. 5, to receive the report of the Committee to adjust existing differences.

The *Railroad Commissioners' Convention* has been called to hold the fourth annual meeting in Atlanta, Ga., Oct. 11.

The *General Time Convention* will meet in New York, Oct. 13.

The *Southern Railway Time Convention* will meet in New York, Oct. 14.

The *Brotherhood of Locomotive Engineers* will hold its annual convention in Baltimore, Oct. 19.

Dividends.

Dividends have been declared as follows:

Chicago, Rock Island & Pacific, 1¾ per cent., quarterly, payable Nov. 1. Transfer books close Sept. 30.

Chicago, St. Paul, Minneapolis & Omaha, 1¾ per cent., quarterly, on the preferred stock, payable Oct. 20. Transfer books close Sept. 30.

Lake Shore & Michigan Southern, 2 per cent., quarterly, payable Nov. 1. Transfer books close Oct. 1.

St. Paul & Duluth, 10 per cent. on the preferred stock, payable in preferred stock or scrip, Nov. 14. Transfer books close Oct. 8.

Foreclosure Sales.

The *Manchester & Keene* road will be offered at public sale in Keene, N. H., Oct. 26, by the trustees, in accordance with the terms of the mortgages of Sept. 19, 1876, and May 21, 1879. The road extends from Greenfield, N. H., to Keene, 30 miles, and has been the subject of some litigation. It was finished in 1878, but was not operated for two years. Lately it has been worked by the Connecticut River company under a temporary contract with the trustees. Its reported liabilities are $500,000 bonds and $800,000 floating debt.

National Association, General Passenger and Ticket Agents.

The regular semi-annual meeting was held in the Southern Hotel, St. Louis, Sept. 20, with a fair attendance. President W. B. Shattuc called the meeting to order at 10 o'clock.

Secretary A. J. Smith presented the minutes of the last meeting; also a number of communications, which were appropriately referred.

A delegation of the National Association of Commercial Travelers waited on the Association and requested permission to address the Association on the matter of special rates for commercial travelers and their baggage. The Association decided not to listen to them, but invited them to put their request in writing and present it at the meeting on the second day.

The Committee on Extra Baggage presented a report, which was laid over to the next day.

On motion a committee was ordered to report appropriate resolutions on the death of the President of the United States. The Chair appointed Messrs. Charlton, Carpenter, Waldo, Atmore, Davidson, Abbott, Wood, Cone, Lord and Taylor, who reported as follows:

"*Resolved*, In view of the calamity which has fallen upon our country in the death of its Chief Magistrate, and the affliction brought upon his widow and children, we desire, in common with all the people of the United States and those of all nations throughout the world, to humbly and reverently express our great sorrow for this mournful event in the history of the nation, and our heartfelt sympathy and condolence for the family of the deceased President.

"*Resolved*, That, as a tribute of respect, the Association now adjourn till 10 a. m. to-morrow."

The Association arose to its feet, and listened with bowed heads to the reading of the resolutions, which were unanimously adopted, and the convention thereupon adjourned.

On the opening of the proceedings on the second day Mr. Atmore read a legal opinion in regard to certain complications arising from the sale of through tickets over several lines by an agent of a single road. It seems that the courts have held that a ticket agent in selling a through ticket can waive the regulations of the connecting roads concerning stop-over privileges.

The Committee on Coupon Tickets reported in favor of having them only sold to and at representative points of importance, and in favor of adopting a uniform tint and form for all coupon tickets. After some discussion the Association adopted the report so far as it related to restricting the number of places to which coupon tickets should be sold, and local committees are to be appointed for certain districts to select such places. The consideration of the balance of the report relating to uniform tint and form was postponed to the next meeting, the Secretary meantime to provide all members with a specimen of the ticket recommended.

The communication of the Commercial Travelers' Association was referred to a select committee of five, who were to confer with the representatives of the Commercial Travelers' Association. The committee reported that they were unable to obtain the interview requested, and the subject was not considered again.

The Committee on Extra Baggage recommended that 150 pounds of personal baggage constitute the limit on every first-class ticket, and 75 pounds on each half ticket; that over and above those weights the extra charge should be at the rate of 15 per cent. on first-class unlimited rate per 100 pounds, and that this rate should apply only to shipments of less than 1,000 pounds and to packages of less than 300 pounds, with all packages in excess at the rate of 25 per cent. The report was adopted.

On motion it was determined to change the time of holding the fall meetings from September to November, the latter being considered a more convenient month in which to meet. The spring session will remain at its former date. The next assembling of the Association will therefore be held at the Windsor Hotel, in New York City, the second Tuesday in March.

After passing the usual resolutions of thanks, the Association adjourned.

In the afternoon the members visited Tower Grove, Forest Park and other points of interest in carriages. The next morning a number started on an excursion to Denver.

ELECTIONS AND APPOINTMENTS.

California Central, Utah Division.—The directors of this new company are: Wm. S. Godbe, John Sharp, Salt Lake, Utah; Lyman Bridges, Austin, Nev.; J. H. Kingshead, Carson City, Nev.; P. W. Johnson, Nevada, Cal.; W. L. French, R. P. Layton, A. H. Washburn, San Francisco; W. W. Walker, New York.

Chicago & Alton.—The office of Mr. A. M. Richards, Division Superintendent, heretofore at Chicago, is removed to Bloomington, Ill., where all communications for him should be addressed.

Chicago, St. Paul, Minneapolis & Omaha.—The following circular from President H. H. Porter is dated Sept. 22:

"The management of the properties of this company, formerly known as the West Wisconsin and North Wisconsin land grants, will be consolidated Oct. 1, proximo, and thereafter be under the immediate direction of Wm. H. Phipps, Land Commissioner.

"Mr. Chas. W. Porter, retiring from the position of Land Commissioner of the first-named grant, in addition to his duties as Secretary of the company, will have full charge of matters relating to right of way of completed lines, and those under construction.

"The offices of Secretary and Land Commissioner will be at Hudson, Wisconsin."

Chicago, St. Paul & Omaha.—The directors of this new company have elected George S. Bowen President; Pindar F. Ward, Secretary; Holmes Miller, Treasurer. The company's office is No. 5 Ogden Building, Chicago.

Columbus, Hocking Valley & Toledo.—The following appointments (chiefly reappointments) are announced for this consolidated road: Orland Smith, General Manager; George R. Carr, General Superintendent; T. J. Janney, Auditor; W. A. Mills, General Freight Agent; W. H. Harrison, General Passenger and Ticket Agent; D. H. Gard, Superintendent of Telegraph; M. T. Seymour, Superintendent Toledo Division (Toledo to Columbus); W. H. Lott, Superintendent Hocking Valley Division (Columbus to Athens and branches); C. D. Norris, Superintendent Ohio River Division (Logan to Pomeroy); F. B. Sheldon, Engineer Toledo Division; W. H. Jennings, Engineer Hocking Valley Division; F. B. Sheldon, Engineer Ohio River Division.

Connotton Valley.—Mr. Francis Bartlett, of Boston, has been chosen President, in place of Wm. J. Rotch, resigned.

Evansville, Seymour & Bellefontaine.—At a meeting held in Evansville Sept. 21 the following directors were chosen: A. W. Carpenter, Robert Pattison, Evansville, Ind.; C. B. Cole, E. C. Devore, Seymour, Ind.; W. H. Dye, Troy, Ind.; George B. Eastin, Louisville, Ky.; J. N. McBeth, Chicago; C. W. Kohlsaat, New York. The board elected Robert Pattison President; C. W. Kohlsaat, Vice-President and Treasurer; A. W. Carpenter, Secretary.

Greenwood, Laurens & Spartanburg.—This company has been organized with the following directors: T. F. Riley, Abbeville, S. C.; F. G. Fuller, Wm. Mills, W. A. Shand, R. P. Todd, Laurens, S. C.; John W. Carlisle, G. Cannon, George R. Deen, James Walker, Spartanburg, S. C.; E. Verdery, Augusta, Va. The board elected E. Verdery President.

Illinois Central.—Mr. Patrick King has been appointed Road Supervisor of the North Division between Amboy and Dubuque, in place of Edward Courtney, who has gone to the Missouri, Kansas & Texas. Mr. King has been a section-master on the road for 20 years.

Indianapolis, Peru & Chicago.—At the annual meeting in Indianapolis recently the following directors were chosen: A. W. Hendricks, V. T. Malott, Indianapolis, Ind.; C. B. Stuart, LaFayette, Ind.; A. L. Hopkins, Solon Humphreys, New York. The board elected Solon Humphreys President; V. T. Malott, Vice-President; W. T. Cannon, Secretary. The road is now worked by the Wabash, St. Louis & Pacific.

International & Great Northern.—Mr. J. W. Goodwin is appointed Superintendent of the Gulf Division, in place of R. B. Pegram, Jr., who has gone to the Memphis and Charleston. Mr. M. J. Burns is appointed Train-Master of the division, in place of E. Moore, resigned.

Joliet & Indiana.—The directors of this new company are: J. F. Wilson, Joliet, Ill.; Clarence T. Barker, Wm. N. Campbell, A. W. Paige, C. E. Sargent, Chicago.

Kansas City, Springfield & Memphis.—The directors of this new company are: Charles W. Blair, Ft. Scott, Kan.; J. Brumbach, J. H. Emmert, Watson J. Ferry, J. S. Ford, George H. Nettleton, Wallace Pratt, L. W. Towne, Kansas City, Mo.; Sidney Bartlett, John A. Burnham, H. H. Hunnewell, Charles Merriam, Nathaniel Thayer, Jr., Boston. The organization is controlled by the Kansas City, Ft. Scott & Gulf Company.

Laporte & Illinois.—This company has been organized at Laporte, Ind., with the following directors: A. C. Badger, Clarence Barber, Wm. N. Campbell, Alonzo W. Page, F. D. Raymond, Charles E. Sargent, John F. Wilson.

Massawippi.—This company has elected Robert N. Hall President; Stephen Foster, Vice-President; W. S. Foster, Secretary and Treasurer. The road is leased to the Connecticut & Passumpsic Rivers Company.

Missouri Pacific.—The jurisdiction of Mr. F. Chandler, General Passenger and Ticket Agent, is extended over all the leased and controlled lines, including the Missouri, Kansas & Texas, the St. Louis, Iron Mountain & Southern, the Texas & Pacific and the International & Great Northern. Mr. O. W. Ruggles, late of the Iron Mountain road, is appointed Assistant General Passenger and Ticket Agent.

New York, Pennsylvania & Ohio.—The following circular from General Superintendent P. D. Cooper is dated Cleveland, O., Sept. 22: "Mr. T. A. Phillips having resigned to accept the position of General Manager of another road, Mr. J. W. Alsop, is hereby appointed Superintendent of the Western Division, with office at Galion, O. Appointment to go into effect Saturday, Sept. 24, 1881."

New York, West Shore & Buffalo.—Mr. Howard Fry has been appointed Superintendent of Motive Power. Mr. Fry received his early training in England, and came to this country in the service of the Grand Trunk road. He left that road in 1873, to become Superintendent of Motive Power of the Erie. After laboring there under many difficulties for some time, he went to the Pennsylvania Railroad about seven years ago, as Superintendent of Motive Power of the Philadelphia & Erie Division, which office he now holds. Mr. Fry is known as a master mechanic of unusual ability and a careful student of his profession.

Potomac, Fredericksburg & Piedmont.—Mr. W. M. Grafton has been appointed Assistant Superintendent, to succeeded Charles Kennedy, late Superintendent of this road. Office at Fredericksburg, Va.

Quebec, Montreal, Ottawa & Occidental.—Mr. C. A. Scott, Assistant Superintendent, who has been very successful in his management on this road, is to be relieved from the immediate charge of the running of trains, in order that he may give more time to the other duties of his office.

Railway Mail Service Association.—At the annual convention in Atlanta, Ga., last week, the following officers were chosen: President, A. J. Miller, Dunkirk, N. Y.; Vice-President, M. A. Buttricks, New Haven, Conn.; Peter P. Waring, Sparkill, N. J.; W. B. Atkinson, Washington; Wallace Rhodes, Atlanta, Ga.; J. W. Shawhan, Columbus, O.; W. P. Campbell, Chicago; W. J. Masterson, St. Louis; B. B. Tuttle, Portland, Or.; Alexander Grant, Monroe, Mich.; board of directors, R. W. Camp, E. C. Finch, J. Frank, P. H. Garrity, D. W. Gore, S. D. Harvey, Norman Perkins, N. S. Pierce, John Towange; Secretary, J. V. Henry; Treasurer, D. R. V. Hartlan.

St. Louis, Iron Mountain & Southern.—Mr. Henry McLaughlin has been appointed Engineer and Superintendent of Construction. He was recently on the Texas and Pacific.

Topeka & Rich Hill.—The directors of this new company have elected officers as follows: President, E. H. Brown, Girard, Kan.; Vice-President, Alfred Ennis, Topeka, Kan.; Secretary, S H. Allen, Pleasanton, Kan.; Treasurer, H. H. Williams, Topeka, Kansas.

Virginia Mining, Manufacturing & Transportation Co.—This company was organized at Winchester, Va., by the election of the following directors: T. M. Almond, P. B. Borst, William R. Denny, B. F. Grayson, B. K. Jamison, P. B. Noland, B. C. Rust. The board elected P. B. Borst President; B. F. Grayson, Secretary; B. K. Jamison, Treasurer.

Virginia, Tennessee & Georgia Air Line.—Mr. Henry Fink has been appointed General Manager of this line, composed of the Norfolk & Western, the Shenandoah Valley and the East Tennessee, Virginia & Georgia roads. Mr. Fink is now General Manager of the Norfolk & Western.

PERSONAL.

—The Wisconsin Democrats have nominated Mr. Ambrose Hoffman for Railroad Commissioner.

—Mr. J. H. Baker, of Mankato, has been nominated for Railroad Commissioner by the Minnesota Republican Convention.

—Mr. Thomas W. Spencer, President of the Herkimer, Newport & Poland Company, has resigned his position, and sold his interest in the road.

—Mr. Wm. B. Porter, Secretary and Auditor of the Valley Railroad Company, of Ohio, was married at Cleveland, O., Sept. 20, to Miss Kate S. Wright.

—Mr. R. B. Pegram, Jr., Superintendent of the Gulf Division of the International & Great Northern, has resigned to accept a position on the Memphis & Charleston road.

—Mr. J. H. Linville, for many years President of the Keystone Bridge Company, has now an office as Consulting Engineer on bridge and railroad work at No. 4,117 Walnut street, Philadelphia.

—Mr. Howard Fry has resigned his position of Superintendent of Motive Power of the Philadelphia & Erie Division of the Pennsylvania Railroad, to accept a similar office on the New York, West Shore & Buffalo road.

—David Graham Drummond Ogilvie, Earl of Airlie, a Scotch peer, died suddenly of a congestive chill at the Windsor Hotel, Denver, Col., Sept. 27, aged 55 years. The Earl of Airlie had large landed estates in Colorado and Oregon, and was President of the Oregonian Railway Company.

—The West Chester & Philadelphia and the Philadelphia & Baltimore Central roads having become part of the Philadelphia, Wilmington & Baltimore, and merged in the general system of the Pennsylvania Railroad Company, Mr. Henry Wood, President of those companies, will retire from his position at the close of the present year, after a service of 27 years.

—Mr. John King, Jr., has renewed his resignation as Receiver of the Ohio & Mississippi, and will sail for Europe shortly. The investigation of his receivership, which he demanded, has been rendered unnecessary by the avowal in open court before Judge Drummond by Gov. Hendricks and Bellamy Storer, counsel representing the interest opposing Mr. King, that there are no charges against his integrity, and that they do not think any can be truthfully made.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Eight months ending Aug. 31:				
Ches. & Ohio.....	$1,787,245	$1,756,382	I. $30,863	1.7
Des M. & Ft. Dodge	243,006	191,418	I. 51,588	27.0
Northern Central.	3,600,683	3,120,012	I. 480,676	15.4
Net earnings.....	1,198,060	973,196	I. 224,864	23.1
Northern Pac fic..	2,051,491	1,399,202	I. 652,289	46.6
Pennsylvania.....	29,143,240	26,606,074	I. 2,537,166	9.5
Net earnings.....	11,932,633	10,951,396	I. 981,237	9.0
South Carolina....	717,712	645,305	I. 72,407	11.2
Month of August:				
Ches. & Ohio.....	$262,858	$259,110	I. $3,748	1.4
Cin. Southern.....	227,741	148,437	I. 79,304	53.3
Des M. & Ft. Dodge	51,439	28,184	I. 23,255	83.1
Northern Central.	498,009	453,924	I. 44,085	9.7
Net earnings.....	94,335	122,957	D. 28,622	23.3
Northern Pacific..	411,624	223,500	I. 188,124	84 0
Pennsylvania.....	3,809,978	3,723,355	I. 86,623	2.3
Net earnings.....	1,444,506	1,554,482	D. 109,976	7.1
South Carolina....	81,183	75,525	I. 5,658	7.4
Second week in September:				
Chi. & Eastern Ill..	$34,571	$31,330	I. $3,241	10.3
Chi. & Alton.....	213,715	216,019	D. 2,304	1.1
Missouri Pacific...	162,818	132,521	I. 30,297	22.8
Wab., St. L. & P..	417,345	306,788	I. 110,557	36.0
Third week in September:				
Louisv. & Nash....	$222,700	$213,000	I. $9,700	4.6
St. L., I. M. & So...	191,400	184,306	I. 7,094	3.9
St. L. & San Fran.	64,100	63,948	I. 152	0.2
Week ending Sept. 16:				
Great Western...	$105,024	$114,270	D. $9,246	8.1

Grain Movement.

For the week ending Sept. 17 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments. Total.	By rail.	P. c. by rail.	Atlantic receipts.
1874.....	4,206,222	2,563,893	351,198	13.7	3,638,261
1875.....	3,512,700	3,689,452	1,378,492	37.5	3,586,717
1876.....	4,360,031	4,089,315	1,820,361	44.5	3,234,870
1877.....	6,655,480	5,040,528	1,082,128	21.5	4,515,770
1878.....	5,851,401	4,852,847	994,118	20.5	6,195,590
1879.....	6,573,503	6,107,358	1,299,302	21.3	6,956,954
1880.....	7,194,477	4,928,509	1,914,236	39.0	5,399,156
1881.....	6,557,238	5,238,890	2,558,588	48.8	5,747,812

The receipts of the Northwestern markets for the week this year are 9 per cent. less than in the corresponding week of last year, and smaller also than in 1879 and 1877; the shipments of these markets are slightly larger than last year or any other, except 1879, and the rail shipments are one-third larger than last year, the rate having been nearly 60 per cent. less. River shipments for the week were 53,451 bushels, or 1 per cent. of the whole. The Atlantic receipts were 6 per cent. more than last year, but less than in 1878 and 1879.

Compared with previous weeks of this year, the Northwestern receipts are the smallest for six weeks and 8 per cent. less than the week before; the Northwestern shipments were with one exception the smallest for six weeks, and 12 per cent. less than the week before; the rail shipments were, however, as large as any since the low rates were made, except those for the first week of those rates, and about the same as for a month past (the railroads carrying about all they can and the lake vessels the balance at more than rail rates). The Atlantic receipts were 5½ per cent. more than the week before, and the largest for five weeks.

Of the Northwestern receipts of the week, Chicago had 57.4 per cent., St. Louis 15.7, Peoria 9.5, Milwaukee 7.8, Toledo 4.9, Detroit 3.3, and Cleveland 1.4 per cent. Chicago continues the usually great lead it has had ever since May; St. Louis, however, has but once or twice received a large quantity this summer; Milwaukee has not received as much before since the middle of June, and but three times this year. On the other hand, the Toledo receipts were extraordinarily small—321,000 bushels, against an average of 803,000 a week in August, and 1,020,000 in September of last year.

Of the Atlantic receipts, New York had 58.8 per cent., Baltimore 11.8, Philadelphia 10.5, Boston 8.8, Montreal 7.4, New Orleans 2.6, and Portland 0.1 per cent. New York's receipts are the largest since July. Compared with the previous week, it gained 392,000 bushels, while there was a loss of 250,000 at Baltimore (due, doubtless, to the elevator blockade), and no considerable gains elsewhere. Considering the very low rates and the large Northwestern receipts, the Atlantic receipts are, as they have been some time, quite light.

Exports from Atlantic ports for five successive weeks have been:

1881.	Week ending Sept. 21.	Sept. 14.	Sept. 7.	Aug. 31.	Aug 24.
Flour, bbls.	53,971	91,108	88,844	83,408	106,193
Grain, bus.	3,190,029	2,569,633	2,843,132	3,845,590	4,138,884
1880.					
Flour, bbls.	97,970	77,582	84,113	88,149	110,191
Grain, bus.	5,114,389	5,348,537	6,234,512	6,743,355	6,444,497

Coal Movement.

Coal tonnages for the week ending Sept. 17 are reported as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Anthracite.....	646,678	647,093	D. 415	0.1
Semi-bituminous.....	93,449	100,345	D. 6,896	6.8
Bituminous, Penna.....	41,237	37,107	I. 4,138	11.2
Coke, Penna.....	45,414	34,268	I. 11,146	32.7

Anthracite trade is still active, and there seems to be abundant market for all the coal reaching tide-water.

The Clearfield coal operators and some of the railroad coal men in the Pittsburgh Region complain that their production is limited by the difficulty in getting cars enough to transport it.

The Cumberland & Pennsylvania road has reduced freight charges on coal from Lonaconing and all points east to Cumberland from 2 cents to 1½ cents per ton per mile. This reduction is in consequence of the competition of the George's Creek & Cumberland road.

A New Fast-Freight Line.

The Detroit *Post and Tribune* has the following regarding the new fast-freight line to Chicago, *via* the Wabash and Baltimore & Ohio railroads:

"Though the slowness of the officials of the Great Western Railway Company, or some other cause, has prevented the Wabash from obtaining a through connection with the East, the West is more fortunate. A fast freight line to Chicago via the Wabash and the Baltimore & Ohio is soon to be established. The arrangements have been completed, and the line will be ready for business in a short time. It is actually the shortest route between Detroit and Chicago, and the delivery grounds in Chicago are very conveniently situated alongside of those of the Michigan Central on the Illinois Central's grounds. A party of officials of the Baltimore & Ohio were in the city yesterday to complete the arrangements. It consisted of T. H. Noonan, Division Freight Agent of the Baltimore & Ohio, whose headquarters are at Tiffin, O.; C. S. Wight, Assistant General Freight Agent; W. E. Lowell, Division Freight Agent, with headquarters at Sandusky, O., and H. B. Smith, Assistant Freight Agent of the Wabash, with headquarters at Indianapolis. There is a fine local traffic on the line of the road, and it will no doubt get a good share of the through business."

RAILROAD LAW.

Rights of Omnibus Lines at Stations.

A telegram to the Chicago *Tribune*, dated Sept. 25, says:

"A case in which the owners of the omnibus lines are interested was decided yesterday by (Iowa) Railroad Commissioner Woodruff. C. & T. Van Hooser, of Cedar Falls, owners of the hotel and omnibus line, have been shut out from the depot of the Illinois Central because of their neglect to deliver passenger baggage to the depot of the Burlington & Cedar Rapids road. Baggage was lost, and the railroad company had to bear the loss, Van Hooser refusing to do so. The latter complained to the Railroad Commissioners, and they decided in favor of the road. They say as the latter is held responsible for the loss of baggage in making the transfer, the company has undoubtedly the right to protect itself by excluding transfer agents who cannot be trusted with the safe delivery of baggage."

THE SCRAP HEAP.

Locomotive Building.

The Rogers Locomotive Works at Paterson, N. J., are building 20 mogul engines for the Central Pacific and several shifting engines for the Richmond & Danville.

The locomotive shops of the Pennsylvania Railroad at Altoona are being enlarged by a new erecting shop and some other buildings.

The Manchester Locomotive Works, at Manchester, N. H., are turning out three engines a week, with a prospect of keeping that rate up for some time.

Nearly all the locomotive shops report an increased number of orders for heavy freight engines. The 16 in. cylinders of a few years ago are giving way to 17, 18 and even 20 in., and the mogul and consolidation types are gradually replacing the light-wheel engines for freight service on Eastern and many Western roads. New orders for eight-wheel engines are chiefly for passenger service, or for Southern roads, where the heavier engines are not yet in use.

Car Notes.

The Bellefonte Car Works, at Bellefonte, Centre County, Pa., will be sold at auction Oct. 27. The works occupy nine acres of ground, with tracks connecting with the Pennsylvania Railroad, and have a capacity of eight box cars a day. The buildings are brick foundry, smith-shop, machine shop, dry-house and framing and erecting shops of brick and a wooden paint-shop. The shops are well supplied with tools. Possession will be given Dec. 10; payments must be made 10 per cent. on day of sale, 20 per cent. Nov. 27, and the rest in seven yearly installments, with 6 per cent. interest. Particulars may be obtained of Miller Tiffin, General Manager, Bellefonte, Pa.; S. R. Hopkins, New York Central & Hudson River Railroad, or of Wm. Lawson, of Wilmington, Mass., the owner of the works.

The Ensign Manufacturing Co. is building car works at Huntington, W. Va., in addition to its car-wheel works.

The car works at Youngstown, Pa., are running over time, with a large force employed.

The Cleveland City Forge & Iron Co. is building a new shop as an addition to its old works.

Iron and Manufacturing Notes.

The Girard Iron Co., of Niles, O., has leased the Thomas Furnace for a term of years.

Emaus Furnace, at Emaus, Pa., has gone into blast. It is run by John Donaldson, H. H. Fisher, George Ormrod and W. Thomas, who have leased it from the Philadelphia & Reading Coal & Iron Co.

The Pennsylvania Steel Co., at Baldwin, Pa., has started up its new Bessemer converters. There are three of them, each of seven tons capacity.

Volcano Furnace, at Massillon, O., has gone into blast.

Brown, Bonnell & Co. expect to start up their new plate mill at Youngstown, O., as soon as it is finished, probably in December.

A contract has been made by James Ward, of Niles, O., to build a large rolling mill at New Philadelphia, O. Work will be begun at once on the buildings.

Several furnaces in the Hocking Valley were obliged recently to bank their fires in consequence of the scarcity of water. The rain in that region last week enabled them to go to work again.

The Rail Market.

Steel rails are quiet, with less business reported at about the same prices, say $60 to $62.50 per ton at mill for November and December, and $58 to $60 for next year's deliveries. Buyers have apparently determined to wait and see if better terms cannot be had. English steel rails are offered at $60.50 to $61.50 at port.

Iron rails are also quiet, but with many sales of small lots. The mills are full of work, but disposed to take more orders at current prices, which continue about $47 to $48 per ton at mill for heavy sections, up to $50 to $52 for light rails.

Steel blooms are reported steady at about $44 per ton, duty paid. Holders are looking for higher prices.

Old iron rails are dull and a weaker market is looked for. Holders, however, still ask $27 to $27.50 per ton in Philadelphia for T-rails and $29.50 to $30 for doubles.

Spikes are firm and unchanged at $2.85 per 100 lbs.; fish-plates, $2.40 to $2.50; track-bolts, $3.25 to $3.75, according to specification.

Stockholders' Diversions.

At a meeting of railway stockholders a plan is proposed for the prevention of accidents—an expensive plan.

"How many passengers do we kill a year?" asks a shareholder.

"So many."

"And what do the damages average?"

"So much."

"Gentlemen, a minute's work with paper and pencil will show you that collisions are 50 per cent. cheaper."—*French Paper.*

In Nevada it seems that stockholder's meetings are not always the cut-and-dried, monotonous affairs they are on the Atlantic slope. At a meeting of the Nevada & Oregon Company in Reno certain parties refused to go out when told to "git" by the chair, and in the fray that followed pistols were drawn, the Secretary and another stockholder were shot and the meeting seems to have wound up in an old-fashioned Arkansas free fight.

A Foot Guard for Trackmen.

Mr. Charles Latimer, Chief Engineer of the New York,

Pennsylvania & Ohio road, has placed on the frogs and guard rails in the Cleveland yard a new invention, called a foot guard. The invention consists of a flat steel spring placed in the opening of frogs and guard rails, or in any place where one's foot would be likely to be caught. This spring fills the place sufficiently to keep the foot out of it, while it will yield to the pressure of the wheel flanges, and thus avoid any risk of running the wheels off the track. This is the invention of Mr. Wm. S. Huntington, author of the "Road-Master's Assistant."

An Old Relic.

The old, weather-beaten, one-story, wooden shanty at the corner of Canal and Kinzie streets, erected 34 years ago, and the first of Chicago's railroad depots, is about to be demolished, after having been a landmark and monument to the city's growth for a generation. Inside of a month the old Northwestern depot will be a thing of the past. It was built in 1847, when the road was called the Galena & Chicago Union Railroad. The directors of the company met in the old building until the old Wells street depot was built. George Bassett, dead and gone for many years, laid the first plank, and at that time Redmond Prindiville was the freight agent.—*Chicago Inter-Ocean.*

A Burning Oil Train.

A destructive oil fire occurred on the New York, Lake Erie & Western Railroad, near Sloatsburg, about 20 miles from this city, yesterday. A full train of cars of crude oil was coming east down the grade when a coupling gave way near the engine. For some unaccountable reason the latter part of the train broke into several pieces and the various tanks came down hill at a frightful rate of speed, the momentum increasing every second. The engineer at once perceived the danger and allowed the engine to go at its best speed. Finally after an exciting race of over two miles the bottom of the grade was reached. The engineer soon noticed that the runaway tanks were fast gaining on the engine, and before he could make enough distance the first tanks collided with the tanks which had remained attached to the engine. In an instant the end tanks were on fire. At first it was but a small stream of oil running from a leak in a tank over a hot journal, but before any sand could be thrown on it the fire communicated to the oil in the tank. The engineer at once separated the undamaged tanks from those which had been injured by the collision and removed them a distance down the track.

All the necessary precautions had been taken to prevent the coming of other trains, and help was at once telegraphed for. The sudden jar of the collision caused the tanks in the rear end of the train to telescope and the oil to catch fire, so that the train was burning simultaneously at two places. The morning express from the west soon came along, and the passengers assisted the train hands in fighting the flames by throwing sand and dirt on the burning cars. Plenty of assistance soon arrived from the neighboring villages, but the heat soon became so intense that it was impossible to get anywhere near enough to them to give them battle. The wrecking train, with a large number of hands, soon arrived from Jersey City, and every endeavor was made to save as much property as possible. The flames shot hundreds of feet into the air, and the few trees which were in the neighborhood were soon consumed. The flames hissed and the burning oil boiled out of the tanks until the generation of gas became too much and the tank exploded with a deafening report. Luckily there were no houses or other buildings in the neighborhood, and the damage was confined to the crude petroleum, the tanks, track and ties. It made sad havoc with the latter. As the oil burned to the ground after the explosion it destroyed the trucks of the cars, the wheels becoming red hot in the blaze. The ties were consumed and the rails curled up in the heat like scraps of paper, the ground being saturated with the oil.

The fire began at nine o'clock in the forenoon, and at noon it was apparent that very little could be done toward putting it out. The telegraph poles had been destroyed and communication with the Jersey City office cut off. Men were set to work building a line of wires round the fire, and soon a wire was in working order. As a last resource a cannon was borrowed from a neighboring iron works and the train hands loading it with railroad iron began a bombardment from the best point they could find. Soon a hole had been shot in the tank nearest the fire and the oil ran down the embankment where the loose earth soon absorbed it. All the cars possible had been moved away and the extinguishing of the fire was soon only a question of time. When the half empty tank exploded soon after it caught fire the flames began to gradually die out. Five large tanks had been consumed, and all that was left of them was scrap iron. It was 5 o'clock last evening before the work could be begun on the hot earth, and it was 10 o'clock before the express train left with its hungry passengers. The fire could be seen and the explosion heard for miles about the conflagration.—*Paterson (N. J.) Press, Sept. 24.*

A New Style of Passenger Car.

Twenty passenger cars are being built at the Boston & Albany car shops at Allston for use in the suburban travel on that road. One train of five cars is now completed, and will probably be put on the road about Oct. 1, an inspection of which shows a complete departure in construction from those now in use. The increasing demand of the patrons of the road for rapid transit and frequent trains led to the need of such trains, and the especial object sought was lightness in weight and light and ventilation for the interior. To this end the services of Mr. Richardson, the architect, were employed. He has made the plans for all above the trucks. The exterior of the cars is finished in narrow, rounded sheathing, that closely resembles corrugated iron. Large windows reach from the letter board about half way to the bottom, and they are so wide that they are separated in most places by only a narrow strip, and the lettering is simply "Boston & Albany Railroad" on the letter board with "suburban service" and the car's number on the side. The interior is finished in paneled chestnut, thus doing away with the ornamented canvas head lining. The seats are of rattan. They run lengthwise, in order to facilitate quick exits. The cars are lighted by 18 or 20 single kerosene bracket lamps, and the package racks are very long. Good ventilation is obtained in the old way by opening the deck windows, which are covered by fine screens. The doors contain large plate glass, and the general appearance is plain, but nice. It is feared that the cost of the first train will exceed that of the old style cars, and also that the cars will exceed the old ones in weight. Officials from the several roads running from Boston have inspected these cars, and are highly pleased with their appearance. The wheels are imported from England, and have steel tires, with wrought iron spokes and hubs.—*Boston Herald.*

A Car-Load of Dynamite.

A dispatch from Council Bluffs, Ia., Sept. 27, says: "At 5 o'clock last evening, just at the close of the Garfield memorial exercises, this city was shaken to its very centre by a terrific explosion. Instantly a great volume of smoke was seen to ascend in the southwestern part of the city. An investigation of the cause of the explosion disclosed the fact that on Saturday a car-load of gunpowder, billed common blasting powder, reached here over the Chicago, Rock Island & Pacific Railroad, and was directed to J. O. Reynolds, Denver, Col. The Union Pacific Company, however, refused to receive the dangerous freight, and the car was returned to the Rock Island yards, where it exploded last evening with fearful force. The concussion demolished the company's round-house, repair shops, brick and freight houses, and about 40 or 50 freight cars. The explosion dug a hole in the ground 15 feet deep and 45 feet in diameter. Large windows in all parts of the city were shattered; sheets of plastering were torn from houses and damage was done in all directions. Even in Omaha, on the opposite side of the river, large windows were broken by the concussion, and the effects were felt as far as Missouri Valley, 20 miles north of here. The loss will amount to hundreds of thousands of dollars."

The car is believed to have contained dynamite instead of common blasting powder.

A Brakeman's Belt.

The Hoole Baggage Check Co. is introducing a brakeman's belt which is somewhat similar to a sword belt, with a sheath for the red flag and pouches for torpedoes. With this it is believed that the brakeman will always be ready to run back and flag a train, or place torpedoes, and not have to run to the caboose to hunt up what he needs.

OLD AND NEW ROADS.

Alameda & San Joaquin.—This company has been organized in California, and has already begun work on its proposed road, which is to run from Alameda, on the east side of San Francisco Bay, by Berkeley, Walnut Creek and the San Ramon Valley to Pleasanton and Livermore and thence by a tunnel through the mountains into the San Joaquin Valley; then for some distance up that valley and eastward again to Bodie.

Anderson, Paris & St. Louis.—This company has been organized to extend the Anderson, Lebanon & St. Louis road from its present terminus at Noblesville, Ind., to Paris, Ill. Work is to be begun on the road very soon.

Big Level & Bradford.—This company has been organized to build a railroad from the Pittsburgh, Bradford & Buffalo, near Howard Hill, Pa., to the Philadelphia & Erie near Kane, a distance of 14 miles.

Bradford, Eldred & Cuba.—Track is now laid on this road from Eldred, Pa., northeast to Wellsville, N. Y., on the New York, Lake Erie & Western road. The last rail was laid Sept. 21, and regular trains began to run this week. The road is 30 miles long and is built to reach a section of the Bradford oil district. The contractors for its construction are Craigie, Rafferty & Yeomans, of Buffalo, who are now at work on an extension to Richburg.

Bradford & State Line.—This company has been organized in Pennsylvania to build a railroad from Bradford, Pa., west by north 20 miles to the New York state line. It is to be a branch of the Rochester & Pittsburgh road.

Burlington & Ohio.—This company has filed articles of incorporation for a railroad from the Mississippi River opposite Burlington, Ia., across Illinois in a southeasterly direction to the Ohio River in Pope County. The distance is about 275 miles.

California Central, Utah Division.—This company has filed articles of incorporation to build a railroad from a point on the western boundary line of Utah near the town of Panache, Nev., eastward by Iron Springs, Cedar City and Coal Creek Cañon to a connection with the Utah Central road; also branches to Iron Mountain and Kanarra Mountain. The capital stock is to be $5,000,000.

California Southern.—Chief Engineer J. O. Osgood informs us that during August five miles of track were laid on this road from the terminus at San Diego Bay, Cal., northward. The road is to be the Atlantic & Pacific branch to Southern California.

Canadian Pacific.—The track on this road is now laid to Brandon, 145 miles westward from Winnipeg, Manitoba, and grading is done for some distance further. The new track and grade were recently inspected by several of the directors and officers of the company.

Catonsville Short Line.—Sufficient stock has been subscribed to secure the building of this road from St. Agnes station, on the Baltimore & Potomac road, to the village of Catonsville, Md., a distance of 3½ miles. The road will probably be worked by the Baltimore & Potomac as a branch.

Cerro Gordo Short Line.—This company has been organized to build a railroad from Maroa, Ill., on the Illinois Central, 10 miles north of Decatur, southeast to Charleston in Coles County, about 55 miles.

Chicago & Evanston.—This company is now securing the right of way for its proposed line from Chicago to Evanston, about 12 miles.

Chicago, Pekin & Southwestern.—The Receiver reports to the Court for July as follows:

Balance, July 1	$7,385
Receipts for the month	35,452
Total	$42,837
Disbursements	32,724
Balance, Aug. 1	$10,113

The receipts exceeded the disbursements by $2,728 for the month.

Chicago, Milwaukee & St. Paul.—The Iowa & Dakota Division is now opened to Chamberlain, Dak., on the Missouri River, 50 miles west of last year's terminus, 148 miles from Marion Junction and 435 miles from the eastern terminus of the division at Calmar, Ia. A circular from the company says: "We desire to announce the opening for business of Chamberlain, Dak., at the Missouri River, on the Iowa & Dakota Division of this line. All freight for the Black Hills and Upper Missouri River, heretofore going via Running Water in connection with Missouri River transportation companies, will now be sent via Chamberlain at same rates. Arrangements are now pending, the completion of which we hope soon to announce to the public, for the establishment by direct connection at Chamberlain with overland transportation companies, of the shortest, quickest, and in all respects most direct and desirable route to Deadwood and other points in the Black Hills."

On the Hastings & Dakota Divisions trains now run through to Aberdeen, Dak., 31 miles beyond last year's terminus, 97 miles westward from Millbank Junction and 311 miles from the eastern end of the division at Hastings, Minn. On the James River Branch of this division trains now run northward from Aberdeen to Frederick, 42 miles, and southward from Aberdeen to Ashton, 30 miles, making 72 miles of the division completed.

Cincinnati Southern.—The Cincinnati Company, which is still operating this road, makes the following statement for August:

Passengers	$48,333.77
Freight	172,470.92
Mail, express, etc	6,535.99
Total ($678 per mile)	$227,740.68
Working expenses	79,719.02
Net earnings	$148,021.66
Interest to stockholders	10,222.55
Balance due trustees	$137,799.11

Working expenses do not include maintenance of way, which the trustees provide for, not the operating company. Maintenance expenses for August were about $47,000, leaving about $90,000 to the credit of the city.

Concord and the Boston & Lowell.—The contract for the joint operation of these roads provides that all existing leases shall be assumed by the joint management; that the rentals of the various roads so leased shall be paid out of the joint earnings, and that the net income from both roads shall be divided between the two companies in the proportion of 60 per cent. to the Boston & Lowell and 40 per cent. to the Concord Company.

The rental charges to be paid are as follows: To the Boston & Lowell for the Massachusetts Central, 25 per cent. of the gross receipts of that road; for the Middlesex Central, $15,000 per year and 6 per cent. on cost of extension; for the Nashua & Lowell, $65,000 per year; for the Wilton road, $14,130 per year; for the Peterboro road, 6 per cent. on cost, taxes and $150 for organization; for the Eastern, $4,800, and the Boston & Maine, $3,000 per year for use of tracks. The rental and contract charges on the Concord Railroad account are: For the Methuen Branch, $11,000 per year; for the Manchester & Lawrence, $101,600 per year; for the Nashua, Acton & Boston, $11,200 per year; for the Concord & Portsmouth, $25,000 per year; for the Suncook Valley, $14,800 per year and 6 per cent. on cost of extension to Hooksett, whenever that shall be built.

Connecticut River.—The wooden bridge over the Deerfield River, near Greenfield, Mass., was set on fire Sept. 21 and completely destroyed. It is believed that the fire was started by an incendiary. The bridge was 600 ft. long and 90 ft. above the river, and some time will be required to replace it. Trains are run around the break by using the New Haven & Northampton's Turner's Falls Branch and main line to East Deerfield, and the Fitchburg track back to Greenfield.

Genesee Valley.—The Rochester (N. Y.) *Democrat and Chronicle* of Sept. 24 says: "At the meeting of the two boards of directors of the Genesee Valley Canal Railroad, just held in New York, it is reported that the conference was an amicable one. Goodrich H. Bush, the largest stockholder on the minority side, has consummated a sale, disposing of his shares to the majority, or Seligman faction. It was rumored a few days ago that he had been offered 25 per cent. more than was paid to the Whitney origina directors, who received but 100 per cent. If this be so, Mr. Bush, therefore, received $125 per share. He owned about 200 shares, and controlled 200 more. This sale was consummated some days prior to the meeting in New York. One of the directors of this proposed road yesterday said: 'As Mr. Seligman is the largest stockholder of the road, it having been heretofore understood that the Clark, Post & Martin interest had been transferred to him, we think it now a matter of certainty that the road will undoubtedly be speedily constructed.'"

Hannibal & St. Joseph.—The following numbers of this company's land grant sinking fund bonds were drawn for redemption under the terms of the mortgage on Sept. 28: 21, 44, 305, 312, 355, 419, 464, 484, 534, 554, 564, 572, 574, 584, 609, 698, 707, 714, 742, 743, 775, 785, 797, 814 and 833. These bonds will be paid on presentation at the office of the Farmers' Loan & Trust Company in New York. Interest on them will cease 60 days from date of drawing.

Indianapolis & Springfield.—This company, which did some work on its projected road several years ago, has recently let a contract for the building of the line from Indianapolis to Montezuma, Ind., 67 miles, to A. J. Harth & Co., of Indianapolis. The contract price is $1,257,000.

Joliet & Indiana.—This company has been organized to build a road from Joliet, Ill., eastward to the Indiana line near Dyer, Ind., about 45 miles. It is said that the intention is to connect with the Louisville, New Albany & Chicago road's extension to Chicago. The proposed line is parallel and close to the Michigan Central's Joliet Division.

Kansas City, Springfield & Memphis.—This company has been organized to build a railroad from Springfield, Mo., southwest to Hopefield, Ark., on the Mississippi, opposite Memphis, a distance of about 270 miles. Separate organizations have been formed in Missouri and Arkansas, to be consolidated hereafter. The new company is controlled by the Kansas City, Ft. Scott & Gulf, and its securities have been offered to the stockholders of that company, as we have heretofore noted.

Laporte & Illinois.—This company has been organized to build a railroad from Laporte, Ind., westward to the Illinois line near Dyer, a distance of 50 miles.

Louisville & Nashville.—Work is to be pushed on the extension of the Knoxville Branch from Lexington, Ky., to the Tennessee line. The bridge over Rockcastle River is finished, and the tracklaying has been begun. The grading is well advanced, and the masonry is being pushed.

Macon & Brunswick.—The location of the extension from Brunswick, Ga., to Atlanta is now entirely completed. The distance is 90 miles, being 18 miles shorter than the Central road. Several sections are already under contract, and the rest will be let very soon.

Manhattan Elevated.—This company makes default on the October interest and dividends due to the New York and the Metropolitan Elevated companies. A hurried application was made to the Court Sept. 28 to permit the issue of receivers' certificates to raise the amount due, but the Court postponed the hearing. It is understood that both the lessor companies will oppose the proposed issue.

Michigan Central.—At a meeting of the board, held in New York, Sept. 27, the following resolutions were adopted,

"*Whereas*, The expenses of the company during the past quarter of the year have largely increased, while the rates for transportation have been materially reduced; and,

"*Whereas*, The net earnings for the present quarter are less than 1 per cent., and there is no surplus on hand applicable to dividend purposes; therefore,

"*Resolved*, That it is not expedient to declare a dividend for the quarter ending 30th of September instant."

No statement of earnings for the quarter was made public.

Millington Coal Field.—This company has been organized to build a railroad from Buckingham, Ill., by Braidwood to a point on the Chicago, Pekin & Southwestern, passing through the Millington and Braidwood coal fields.

Mobile & Ohio.—Track on the Cairo Extension is now completed to East Cairo, Ky., and trains were to begin running through from Mobile to East Cairo, 495 miles, on Oct. 1. The inclined planes and transfer wharves on both sides of the river, at East Cairo and Cairo, are ready for use, and a large steam transfer boat has been provided for the ferry across the river. The company has secured a tract of land in Cairo large enough for its yards there and for the connection with the Cairo & Vincennes track.

By an agreement duly executed the option is given to the holders of the Cairo Extension bonds of this company ($300,000) to cancel the sinking fund, by means of which said bonds are redeemable at the pleasure of the company. The right is reserved to pay off at par such bonds as do not avail of the privilege.

Necedah & Southwestern.—This company has been organized to build a railroad from Necedah, Wis., southwest to Camp Douglas, on the La Crosse Division of the Chicago, Milwaukee & St. Paul. The distance is about 15 miles.

New Orleans & Northeastern.—Sealed proposals will be received until Oct. 20 for the construction of the trestle-work across Lake Pontchartrain near Point aux Herbes light-house in Louisiana with the approaches thereto.

Sealed proposals will also be received until Oct. 20 for the construction and erection of all the machinery necessary for timber-creosoting works on the waters of Pearl River in Louisiana, above Gainesville, Miss., on the line of this road.

Bids must be sent to John Scott, General Manager, at No. 134 Vine street, Cincinnati, O. Plans and specifications can be seen and blank forms obtained of G. Bouscaren, Consulting Engineer, at the same address.

New Orleans Pacific.—The officers of this company last week inspected this road for 100 miles southwest from Shreveport, La., and accepted it from the contractors as completed.

Work is also progressing rapidly on the other end of the line. It is not probable that regular trains will be put on the newer portion of the road until it is completed through from New Orleans to Shreveport.

New York, Lake Erie & Western.—The Buffalo *Express* says: "Mention has been made in this column of the extensive freight-yard which the Erie is now opening at East Buffalo. Its local work aside from this is also extensive, and there is much beside to note both along the old line and also in regard to the new schemes which it has in view.

"The new grade which the Erie is making from East Buffalo to the junction at Black Rock is being pushed with a large force of workmen. A party of engineers from Castile, under charge of Mr. C. C. Laney, were yesterday making levels for this track near Black Rock. They left the city last evening for Castile, but will return here from time to time as engineering service is needed. It is hoped to have freight shipping over this new track before the close of the year.

"Improvements in grade on the Buffalo Division of the Erie are fast being made, and are a great gain. Three loops, or new tracks, giving easier grades, are nearly finished. At Dane 800 feet of new track is laid; at Gainesville 2,000 feet will be ready in two or three weeks, and 800 feet at Portage will be ready within a month. At the latter place the grade will be 30 feet to the mile—20 feet less than formerly. When these loops are all finished the old track will be abandoned, and it will then be easy to take a train of 50 cars from Buffalo to Hornellsville with one engine, by using a pusher at Attica, whereas now 30 cars are the limit. These improvements in the road-bed will be a great help in times of heavy freight."

New York & New England.—Since this company adopted the system of cheap suburban fares in April last, putting tickets to all stations five miles or less from Boston at a uniform rate, it has sold 349,905 tickets at 5 cents each.

A dispatch from Boston, Sept. 28, says: "Judge Devens, of the Supreme Judicial Court, in the case of Ellis and another against the Boston, Hartford & Erie Company, to-day ruled, on the petition of Hart and Clark, Trustees under the Berdell mortgage, to have their accounts referred to a Master, that the Boston, Hartford & Erie Railroad was at liberty at any time to have a rehearing on all interlocutory orders and decrees should it so petition for review. The Boston, Hartford & Erie Railroad, by counsel, accordingly filed yesterday in court such petition, and it appears now that this much contested suit is to be again reopened."

Niagara Falls.—Notice is given of application to the Ontario Parliament for a charter for a railroad along the Canadian side of the Niagara River from the Falls to Queenstown; also an inclined railroad from the foot of the Horse Shoe Falls to the bank above.

Northern Pacific.—On the Pend d'Oreille Division track is now laid to Lake Prescott, Wash. Ter., 58 miles north by east from the late terminus at Spokane Falls and 208 miles from the starting point on the Columbia River at Ainsworth. Lake Prescott is 20 miles west of the head of Lake Pend d'Oreille, and the grading to that point is completed. Work has been begun on the bridge across the head of Lake Pend d'Oreille, which will require some time to finish. Grading is in progress for 50 miles east of the lake.

The Portland *Oregonian* of Sept. 17 says: "On Tuesday the *Oregonian* received a dispatch from Mr. T. F. Oakes, Vice-President of the Northern Pacific Railroad Company, who is now in New York, bringing the information that that company, in view of the large volume of business expected on the opening of its through line across the continent, has decided to construct a line on the north side of the Columbia River from Ainsworth to the Dalles. Work is to commence on this division at once.

"We may suppose that the road will cross the Columbia just above the town of Dalles and there connect with the Oregon Railway & Navigation Company's line; or perhaps it may be continued on the Washington side to some point of crossing further down. Of this, however, we have no positive knowledge. It is pretty certain, however, from the resolution which the company has taken to build down the Columbia, that the line across the Cascade mountains to the north will not be undertaken yet. The connection at Walla Walla with the Oregon Railway & Navigation Company's line is doubtless deemed insufficient for the business, inasmuch as the roads and branches of the latter company, penetrating so many parts of Eastern Oregon and Washington, will furnish all the business which the line on the south side of the river can readily carry. Hence the Northern Pacific Company will construct this line on the north side for the easier operation of their own through and local lines.

Gen. Herman Haupt, General Manager, has issued the following circular regarding the transportation of fuel and grain for settlers along the road:

"To correct erroneous impressions, the undersigned desires to state that so far from being indisposed to accommodate settlers and others, the management of the Northern Pacific Railroad is disposed to go to the extreme of carrying necessary articles without any profit whatever, rather than permit suffering and inconvenience for want of them.

"The following circular was not intended to convey the impression that the company would not carry wood for settlers, but to caution them to provide in time, and not leave their winter supplies until the stock of wood should be exhausted and the road blockaded, when it might be impossible for the company to respond promptly to calls for relief.

"As the forests become cleared the cost of wood will annually increase, and it is wise, therefore, for settlers to become from year to year less dependent upon the railroad by planting trees and by substituting coal.

"Trees, wood and coal will be carried at an average price which pays only the cost of running trains, and contributes nothing to general and terminal expense.

"Parties furnishing coal have agreed to retail it at stations at wholesale prices, adding 75 cents per ton to cover wastage and expenses, which is barely sufficient.

"Half rates have been issued on stoves, under an assurance from the manufacturers that the whole benefit of the reduction should be given to the settlers.

"In reference to the constant complaint of insufficiency of cars to move the wheat crop, it is proper to state that the equipment of grain-cars has been nearly doubled since last season, but that no reasonable amount of equipment can move in one month the tonnage which should be distributed over four; and, if such equipment were provided, it would remain idle the balance of the year, causing a loss far in excess of all the profits of the business.

"Patrons of the road must not expect impossibilities; cars cannot be furnished to remove wheat as fast as it is threshed in the fields. They must provide suitable places of storage.

"Every effort will be made to avoid favoritism, and to treat all with fairness and impartiality.

"The rules in regard to moving cars not loaded in the time allowed, and to charge for demurrage, are designed for the protection of shippers themselves, that the crop may be moved with the equipment on hand with the least delay possible."

Ohio Central.—This company has this season built a passenger depot and freight warehouse, round-house, machine shops, and car-house in East Toledo. Ten tracks have been laid on a dock constructed on the river front, the stream being dredged to obtain the required depth and allowing the largest lake vessels to discharge and receive lumber and coal at the pier.

A branch is soon to be built through the valley of Monday Creek to Athens, which will reach several important furnaces and a number of coal mines. This branch will be nearly parallel to the Columbus, Hocking Valley & Toledo's Monday Creek Branch.

Surveys are being made for the extension of the main line from Corning to McConnellsville.

Pennsylvania.—On this company's Philadelphia & Long Branch line, track has been laid from Sea Side Park, N. J., northward along the shore to Bay Head, a distance of eight miles, making the line 25 miles long from Pemberton. At Bay Head connection is made with the extension of the New Jersey Central's Long Branch Division for the present, but the road is to be extended northward to Point Pleasant and thence along the shore to Long Branch.

Surveys are being made for a branch or loop line, leaving the main line at Bolivar, Pa., five miles east of Blairsville Intersection, and running parallel to but some distance north of the main line to Blairsville, about eight miles. It is said that this new line is part of a plan to make the West Pennsylvania Division a loop or second line to relieve the main line.

Work has been begun on a new erecting shop and some other buildings at Altoona, where more room still is needed for the locomotive work.

This company's statement for August shows for all lines east of Pittsburgh and Erie, as compared with August, 1880:

An increase in gross earnings of (2.3 per cent.)	$86,623
An increase in expenses of (9.1 per cent.)	196,599
Net decrease (7.1 per cent.)	$109,976

For the eight months ending Aug. 31, as compared with the corresponding period in 1880, the same lines show:

An increase in gross earnings of (9.5 per cent.)	$2,537,166
An increase in expenses of (9.9 per cent.)	1,555,929
Net increase (9.0 per cent.)	$981,237

All lines west of Pittsburgh and Erie for the eight months of 1881 show a surplus over liabilities of $2,160,087, being a gain as compared with the same period in 1880 of $285,540

Richmond & Allegheny.—The main line of this road was completed last week by laying track on the gap of seven miles between Holcomb's Rock, Va., and Big Island, and this week regular trains begin running over the whole line of 230 miles from Richmond to the Chesapeake & Ohio at Williamson. Tracklaying is in progress on the branch from North River to Lexington, which will probably be finished next month.

St. Louis, Jerseyville & Springfield.—It is stated that this road will not be sold to the Wabash, St. Louis & Pacific as at first proposed, but will be leased to that company as soon as completed.

St. Paul & Duluth.—At a recent meeting of the directors of this company Commissioners were advised to examine into its affairs and determine the disposition of the assets. The Commissioners have accordingly directed that a 10 per cent. dividend of preferred stock be made among the stockholders, payable on a date to be named in the near future.

Securities on the New York Stock Exchange.—The following securities have been placed on the lists at the New York Stock Exchange:

Atlantic & Pacific.—First-mortgage bonds, $5,000,000; income bonds, $3,750,000.

Carolina Central.—First-mortgage bonds, $2,000,000.

Evansville & Terre Haute.—Stock, $3,000,000, in shares of $50 each; consolidated bonds, $3,500,000.

International & Great Northern.—Additional first-mortgage bonds, $450,000.

Kentucky Central.—Stock, $5,500,000; general-mortgage bonds, $4,500,000.

Louisville & Nashville.—New 6 per cent. bonds secured on 172 miles of road, $1,500,000.

Pittsburgh, Bradford & Buffalo.—First-mortgage bonds, $500,000.

St. Paul & Duluth.—First-mortgage bonds, $1,000,000.

Sterling Mountain.—Income bonds, $476,000, bearing 7 per cent. interest.

Sinaloa & Durango.—Mr. E. P. North, the Engineer and Superintendent, examined the route for this proposed road from the town of Durango across the mountains in July. From Durango north or west about 180 miles through Santiago Papasquiero to the Boca de Santa Caterina there is a very easy route except for about 12 miles, much of the way with very rugged mountains on each side. Thence south of west 90 miles to Canelas, in the Sierra Madre, there will be difficult work. The elevation above the sea here is from 8,000 to 8,500 ft. The timber is chiefly pine, fir and oak, and the temperature cool even in summer, 76° being the highest observed while crossing in July. In winter there is sometimes a light fall of snow. From Canelas the route southwest down the Pacific slope of the Sierra Madre is a comparatively easy one. There wheat and corn, sugar-cane and the fruits alike of the temperate and torrid zones are grown. The part of the road first to be built is not on this side, but from the Gulf of California at Altata (about 150 miles northwest of Mazatlan and 275 southeast of Guaymas) northeastward to Culiacan, about 50 miles.

Sonora.—Reports from Mexico have been to the effect that work on the line from Hermosillo, Mex., to Tucson, Arizona, had been stopped by the government, on the ground that the company was bound to build the line direct from Hermosillo to El Paso. It is now stated that the government will not oppose the building of the Tucson line, but will require the completion of the El Paso line within five years, in pursuance of the terms of the concession.

Texas, Arkansas & Louisiana.—This company has been organized to build an extension of the Houston, East & West Texas from the Texas state line at Logansport northwest to Shreveport, La., and thence to the Arkansas line in the direction of Camden.

Texas & St. Louis.—Arrangements have been completed to consolidate the Missouri and Arkansas companies of this name, formed to extend the road from Texarkana to Cairo.

Train Robbery.—The train on the St. Louis, Iron Mountain & Southern Railway, which left Texarkana at 8 o'clock on the night of Sept. 22, was boarded at Hope, Ark., by three young men. After passing Prescott, and when near Kensett, they suddenly drew revolvers and ordered the conductor to stop the train, which he did. They then proceeded to make the passengers throw up their hands and went through them, getting $700. They then visited the express car, opened the messenger's safe and took $30,000 in currency. Before leaving the train they threw a package containing $15,000 back, under the impression that it was valueless.

Another dispatch says that the train was eight miles south of Prescott when three men presented cocked revolvers to the conductor and bade him stop the train, which he did as quick as possible. He was in such a hurry to stop the train that he pulled the bell-cord in two. All the robbers went to the express car, made the messenger open the safe, from which they took about $16,000, which was about half the money there was in it, and then went through the coaches and robbed the passengers of $800. All three men were very young. None of them were masked or had any beard.

The company has offered a reward of $5,000 each for the arrest of the three robbers. The state authorities have offered a smaller reward.

Union, of Atlanta.—This company has secured a charter from the Georgia Legislature for a belt line around Atlanta, to connect all the railroads entering that city. The line will be about seven miles long. The incorporators represent all the companies whose lines will be connected.

Virginia Mining, Manufacturing & Transportation Co.—This company has been organized at Winchester, Va., to build a branch of the projected Baltimore & Western road running through Winchester.

Virginia, Tennessee & Georgia Air Line.—Contracts were concluded in New York, Sept. 28, for the consolidation of the business of the East Tennessee, Virginia & Georgia, the Norfolk & Western and the Shenandoah Valley roads. The details of the contract are not made public, but it is understood that the companies will retain their separate organization, but the three roads will be operated under one management and as one line, with one General Manager, under the supervision of an executive committee composed of the Presidents of the three companies. This arrangement completes the business union of three lines whose interests are largely the same, and which are largely dependent upon each other for business. The consolidated line will be known as the Virginia, Tennessee & Georgia Air Line.

Wabash, St. Louis & Pacific.—At the special meeting in St. Louis, Sept. 28, the stockholders voted to approve the agreements for the purchase and consolidation of the Danville & Southwestern, the St. Francisville & Lawrenceville, and the Cairo & Vincennes roads, and for the lease of the St. Louis Bridge.

ANNUAL REPORTS.

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Kansas City, Ft. Scott & Gulf.

At the close of the year 1880, which is covered by its last annual report, this company worked the following lines:

	Miles.
Main line, Kansas City, Mo., to Baxter Springs, Kan	159.92
Union Transit Co., spur in Kansas City	1.28
Rich Hill R. R., Pleasanton, Kan., to Rich Hill and Carbon Centre, Mo	27.54
Ft. Scott, S. E. & Memphis, from near Ft. Scott, Kan., to Golden City, Mo	48.79
Ft. Scott, S. E. & Memphis, Arcadia, Kan., to coal mines	2.48
Short Creek & Joplin, Baxter Springs to Joplin, Mo	15.46
Springfield & Western Mo., Springfield, Mo., to Ash Grove	19.00
Mem., Kan. & Col. (narrow-gauge) Weir City, Kan., to Parsons	31.04
Total	305.51

There were 40 miles of sidings on all the lines. The Rich Hill Branch and 36.04 miles of the Ft. Scott, Southeastern & Memphis were built and the Springfield & Western Missouri bought during the year. Since the close of the year the connection between the last-named two lines has been finished.

The general balance sheet was as follows:

Common stock		$4,000,000.00
Contracts for preferred stock		2,750,000.00
Bonded debt		3,056,900.00
Accrued interest, accounts, etc		90,441.60
Income land account		89,023.19
Income account, balance		200,003.36
Total		$10,186,368.15
Road and equipment	$9,538,055.90	
Materials	115,455.74	
Stocks and bonds	101,956.41	
Bills and accounts receivable	381,014.30	
Cash	49,885.80	
		10,186,368.15

The bonded debt consists of one issue, first-mortgage bonds bearing 7 per cent. interest; it was reduced $943,100 by purchase of bonds with proceeds of the land grant. There were $1,583,000 branch bonds on which this company pays interest. The sum of $225,099.16 was added to construction account.

The traffic for the year, excluding the narrow-gauge line, was as follows:

Train miles:	1880.	1879.	Inc. or Dec.	P. c.
Passenger	200,402	190,029	I. 10,373	5.5
Freight	453,534	422,545	I. 30,989	7.3
Service and switching	302,777	184,722	I. 118,055	63.8
Total	956,713	797,296	I. 159,417	20.0
Car miles:				
Passenger train cars	878,568			
Freight cars	8,047,097			
Passengers carried	257,530	155,726	I. 101,804	65.3
Passenger miles	8,819,638	5,585,154	I. 3,234,484	57.9
Rate per pass. per mile	3.37 cts.	3.74 cts.	D. 0.37 ct.	10.0
Tons freight carried	672,397	494,577	I. 177,790	35.9
Ton miles	49,435,645	35,972,107	I. 13,463,538	37.4
Rate per ton per mile	1.71 cts.	1.76 cts.	D. 0.05 ct.	2.8
Av. train load:				
Passengers, No	44.01	29.39	I. 14.62	49.7
Freight, tons	109.01	85.14	I. 23.87	28.0

Locomotive service cost 14 32 cents per mile. Of the freight car mileage 60.7 per cent. was of loaded cars; 4,355,407 miles were made by foreign cars.

The earnings for the year were as follows, excluding the narrow-gauge line, the average mileage worked being 190.3 miles in 1880, and 162.38 miles in 1879:

	1880.	1879.	Increase.	P. c.
Passengers	$297,339.79	$209,950.87	$87,388.92	41.6
Freight	844,564.85	631,783.53	212,781.32	33.7
Mail and express	33,795.88	31,580.32	2,247.56	7.1
Miscellaneous	36,663.44	22,581.67	14,081.77	62.4
Total	$1,212,363.96	$895,864.39	$316,499.57	35.3
Expenses	680,441.08	563,053.08	117,388.00	20.8
Net earn.	$531,922.88	$332,811.31	$199,111.57	59.8
Gross earn. per mile	6,370.80	5,517.08	853.72	15.5
Net earn. per mile	2,795.18	2,049.58	745.60	36.4
Per cent. of exps.	56.10	62.80		

Expenses include taxes, which were $54,369.11 in 1880, and $45,815.34 in 1879. The increased business was chiefly from the main line, the new branches having been opened late in the year.

The earnings of the narrow-gauge line appear to have been $10,503.07; expenses, $16,510.72; deficit, $6,007.65. The track of this line from Weir City to Messer, 10.75 miles, was taken up, and the materials used in an extension from Parsons to Caerryvale, 18.73 miles, now in progress. A third rail is to be laid from Weir City to Cherokee, 5 miles, to avoid transhipment of coal.

The Land Department reports sales of 346,902.59 acres for $1,290,145,90, an average of $3.72 per acre. There were also 210 town-lots sold for $10,039.17, making total sales for the year $1,300,185.07. The cash receipts on land contracts were $1,151,667.80, expenses of the department, $58,444.40. The land contracts held amount to $342,549.40. Much attention has been paid to tree culture on the company's lands; thus far the catalpa has been the most successful of all trees planted.

The income account was as follows, including the narrow-gauge line's earnings and expenses:

Gross earnings		$1,222,867.03
Interest and dividends		53,175.22
Premium on Ft. Scott, S. E. & Mem. bonds exchanged		5,039.99
Total		$1,281,082.24
Debit balance, Jan. 1, 1880	$5,321.31	
Expenses and taxes	606,951.80	
Interest on bonds	234,350.10	
Interest on bonds of leased lines	36,936.67	
Premium on Ft. Scott, S. E. & M. bonds	11,360.00	
Dividends on preferred stock	219,837.00	
		1,204,756.88
Balance to credit of income		$76,325.36

Two dividends from the earnings of the year were paid on the outstanding contracts for preferred stock, one of 3½ per cent. Aug. 10, 1880, and one of 4½ per cent., Feb. 15, 1880.

During the year 1,435 tons of steel rails were laid; 64.47 miles of main track are now of steel. There were 13,026 feet of new sidings built. A new iron trestle 448 ft. long and 46 ft. high was built, and one wooden trestle replaced by a stone culvert and earth embankment. Nearly all the depots on the line were repaired.

There was added to the equipment 6 locomotives, 3 passenger cars, 5 cabooses, 50 box, 50 stock and 150 coal cars. Also 20 box and 32 coal cars of narrow gauge.

The Rich Hill Branch, 27.54 miles, with 2.92 miles of sidings, was built during the year; also the Ft. Scott, Southeastern & Memphis line to Golden City, 36.04 miles. Since the close of the year the last-named line has been extended to Ash Grove, completing the line to Springfield, Mo. Arrangements have been made for its extension to Memphis next year.

Cumberland Valley.

This company owns a line from Harrisburg, Pa., to Williamsport, Md., 82 miles. It leases and largely owns the Martinsburg & Potomac, from Williamsport to Martinsburg, W. Va., 12 miles; the Southern Pennsylvania, from junction to Richmond with spur to Mercersburg, 21.4 miles, and the Dillsburg & Mechanicsburg, from junction to Mechanicsburg, 7.7 miles, making 41.1 miles leased. It also controls, but does not work, the Mont Alto road, a branch to Waynesboro, 18.3 miles, and the South Mountain road, a branch to Pine Grove, 17.8 miles.

The general account was as follows:

Stock		$1,777,850.00
Bonds		352,300.00
January interest and dividends		48,233.95
Balance, Jan. 1, 1880	$585,006.73	
Surplus for the year	9,661.18	
		594,667.91
Total		$2,773,051.86
Cost of road	$1,887,465.95	
Materials on hand	71,186.94	
Trustees of contingent fund	583,949.54	
Accounts	71,733.42	
Cash	158,716.01	
		2,773,051.86

Of the stock there was $241,900 first-preferred, $243,000 second-preferred and $1,292,950 common stock. Of the bonds $161,000 are first-mortgage bonds, $109,500 second-mortgage bonds and $81,800 common bonds.

The traffic for the year was as follows:

Train miles:	1880.	1879.	Inc. or Dec.	P. c.
Passenger	188,808	168,104	I. 20,704	12.3
Freight	147,260	115,368	I. 31,892	27.7
Total	336,068	283,472	I. 52,596	18.6
Locomotive miles	448,808			
Passengers carried	391,083	323,045	I. 68,038	21.1
Tons freight carried	444,721	372,920	I. 71,801	19.3
Ton miles	14,048,062	11,624,309	I. 2,423,753	20.9
Av. freight train load	95.4	100.8	D. 5.4	5.3

The passengers carried include the leased lines; the freight tonnage is for the main line only. Passengers include 322,098 regular tickets, 62,643 excursion and 6,342 commutation. Passenger trains earned 101.04 cents gross and 36.84 cents net per mile; freight trains, 228.84 cents gross and 102.87 cents net; average of all trains, 157.05 cents gross and 65.78 cents net.

The earnings of the main line for the year were as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Freight	$337,006.94	$300,933.78	I. $36,073.16	11.9
Passengers	173,827.19	152,422.09	I. 21,405.10	14.1
Mail, etc	26,111.65	50,241.85	D. 24,130.20	48.2
Total	$536,945.78	$503,597.72	I. $33,348.06	6.6
Expenses	306,745.95	238,697.70	I. 68,048.25	28.5
Net earnings	$230,199.83	$264,900.02	D. $34,700.19	13.1
Gross earnings per mile	6,548.12	6,126.49	I. 421.63	6.6
Net earnings per mile	2,807.32	3,222.63	D. 415.31	13.1
Per cent. of expenses	57.13	47.40	I. 9.73	—

The expenses were increased by greater passenger train mileage, additional trains having been run to accommodate connecting roads and local travel. The traffic showed a greater increase than earnings.

The disposition of net earnings for the year was as follows:

Net earnings		$230,199.83
Real estate purchased	$6,478.50	
State taxes	9,727.15	
Interest	26,548.00	
Dividends, 10 per cent	177,785.00	
	220,538.65	
Surplus for the year		$9,661.18

The usual quarterly dividends of 2½ per cent. each were paid from the earnings.

The business of the leased lines was as follows:

	Mart. & Potomac.	Dillsb'g & Mich.	Southern Penn.
Tons freight carried	27,436	45,426	33,868
Gross earnings	$18,536.35	$20,250 01	$21,568.12
Expenses	14,942.40	13,450.94	18,960.35
Net earnings	$3,593.86	$6,799.07	$2,607.77
Gross earn. per mile	1,544.70	2,629.87	1,007.86
Net earn. per mile	299 49	882.99	121.85
Per cent. of ex.	80.7	66.3	87.8

All these roads show a considerable gain both in business and earnings.

The Mont Alto road, in which this company is largely interested, carried 47,818 passengers and 34,530 tons freight. Its earnings were $27,513.44, an increase of nearly 60 per cent. over 1879.

During the year 600 tons of steel rails and 32,983 new ties were used in renewals. There are now 55¼ miles of track laid in steel. There are 7 miles of second track and 12.4 miles of sidings.

The equipment was increased by a new passenger car and 33 box cars, and two new engines were ordered. The passenger cars were equipped with the Janney coupler, and speed indicators put in the cabooses.

One pier of the Susquehanna bridge was rebuilt and others repaired. Road and bridges generally were kept in good order.

Much business is expected from the Shenandoah Valley road, now nearly finished.

St. Louis, Iron Mountain & Southern.

We have heretofore presented a brief summary of this company's report for 1880, and now give a fuller abstract of the same. The road worked was the same as in 1879, the main line from St. Louis to Texarkana, 490 miles; the branches from Bismarck, Mo., to Belmont, 120 miles; from Poplar Bluff, Mo., to the Mississippi opposite Cairo, 71 miles, and from Mineral Point, Mo., to Potosi, 3.5 miles, making 684.5 miles in all.

The equipment consists of 187 locomotives; 58 passenger, 1 sleeping, 5 postal and 24 baggage, mail and express cars; 1,419 box, 431 Green Line and Texas Line box, 667 stock, 1,401 flat and 65 caboose cars; 2 directors' cars and 8 service cars.

The general account was as follows:

Stock		$21,459,821.00
Bonded debt		30,078,810.00
Funded interest		18,202.50
Interest accrued		1,038,116.96
Bills payable, real estate		141,299.43
Bills, accounts and balances payable		1,585,905.86
Total		$54,322,155.75
Construction and equipment	$47,321,484.90	
Real estate	111,675.29	
Land notes, etc	671,472.06	
Land grant	3,407,967.92	
Supplies	365,822.05	
Cash and receivables	737,591.81	
Income account, debit balance	1,706,141.72	
		54,322,155.75

The bonded debt at the close of the year consisted of $4,000,000 St. Louis & Iron Mountain first-mortgage bonds; $6,000,000 St. Louis & Iron Mountain second-mortgage bonds; $2,500,000 Arkansas Branch bonds; $1,450,000 Cairo, Arkansas & Texas bonds; $7,900,000 Cairo & Fulton bonds; $73,000 Cairo & Fulton income bonds; $4,140,090 first-preferred income bonds, and $4,017,720 second-preferred income bonds. Since the close of the year a general mortgage has been executed, in which it is intended to merge all the existing debt.

Since the close of the year nearly all the stock has been exchanged by holders for Missouri Pacific stock, transferring the control to that company.

The Land Department reports sales in Arkansas of 65,915.9 acres for $237,188.42. Cash collections on land contracts were $164,299.12. The expenses were $57,979.28. Back taxes paid up were $62,100. There was an increased demand for Arkansas lands, and increased immigration and settlements are reported.

In Missouri the Land Department sold 2,139.06 acres for $8,599.95. Cash receipts on land contracts were $9,015.60; the sum of $7,155.60 was received in land notes.

The earnings for the year were as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Freight	$4,697,047.49	$4,103,664.78	I. $593,382.71	14.5
Passengers	1,238,873.77	981,151.12	I. 287,722.65	29.3
Mail and exprs	229,266.36	171,838.51	I. 57,427.75	34.5
Miscellaneous	70,409.78	35,956.86	I. 34,452.92	95.7
Total	$6,265,597.30	$5,292,611.27	I. $972,986.03	18.4
Expenses	4,075,226.37	2,992,056.07	I. 1,083,170.30	36.2
Net earnings	$2,190,370 93	$2,300,555.30	D. $110,184.27	4.8
Gross earn. per mile	9,153.54	7,732.08	I. 1,421.46	18.4
Net earn. per mile	3,199.96	3,360.92	D. 160.96	4.8
Per cent. of ex.	65.04	56.54	I. 8.50	

The increase in earnings was due to the largely increased traffic. The increase in expenses was due to the generally lower rates, to largely increased renewals, and the increased service, especially on passenger trains.

The income account was as follows.

Balance (debit) from previous year		$1,577,753.79
Change of gauge, balance		774.60
Taxes on Arkansas trust lands		61,942.06
Car-trust expenses		64,177.43
Interest and exchange		69,337.41
Interest on mortgage bonds		1,543,038.32
Interest on preferred income bonds		542,560.18
Equipment		17,463.91
Bad debts charged off		19,464.95
Total		$3,896,512.65
Net earnings for the year		2,190,370.93
Debit balance, Dec. 31, 1880		$1,706,141.72

There were charges to capital account during the year of $799,746.66 for new construction and $326,517.27 for equipment, making $1,126,263.93 in all.

The traffic for the year was as follows:

	1880.	1879.	Inc. or Dec.	P.c.
Train miles, passenger	86 ,064	785,355	I. 74,700	9.5
Train miles, freight	2,037,335	1,697,794	I. 339,541	20.0
Total locomotive miles	4,175,485	3,325,068	I. 850,417	25.6
Passenger car miles	4,482,613	4,133,374	I. 349,239	8.5
Freight car miles	42,252,098	36,380,140	I. 5,871,958	16.1
Passengers carried	829,152	652,757	I. 176,395	27.0
Passenger miles	45,831,042	31,348,280	I. 14,482,762	46.2
Tons freight carried	1,187,097	981,139	I. 205,958	21.0
Ton miles	263,223,376	226,573,979	I. 36,649,397	16.2
Av. train load:				
Passengers, No	53.3	39.9	I. 13.4	33.6
Freight, tons	129.0	133.5	D. 4.5	3.4
Av. receipt:				
Per pass. per mile	2.77 cts.	3.13 cts.	D. 0.36 ct.	11.5
Per ton per mile	1.78 "	1.88 "	D. 0.10 "	5.3

Locomotive service cost 20 cents per mile. The average earnings per train mile were $1.48 on passenger and $2.30 on freight; average, $2.16.

The average rate per ton per mile was 2.08 cents on north-bound local freight; 3.01 cents on south-bound local; 1.31 cents on north-bound through; 1.58 cents on south-bound through; an average of 2.43 cents on local and 1.49 cents on through, or of 1.75 cents on all north-bound and 2.00 cents on all south-bound freight. Of the total ton-mileage 42.1 per cent. was of local and 57.9 per cent. of through freight; 46.1 per cent. was of north-bound and 53.9 per cent. of south-bound freight. Of the freight-car mileage 22.3 per cent. was of empty cars. The average south-bound freight train was 31.2 cars; north-bound, 20.3 cars.

Leading items of freight were 211,270 tons iron ore, 361,536 bales cotton, 205,884 tons lumber, 155,493 tons grain and flour, 4,901 car-loads of live stock and 14,256 tons coal. There was a large decrease in cotton and stock; an increase in ore, grain and lumber.

During the year extensive additions were made to the buildings in St. Louis and a number of new buildings were erected along the line. Several bridges were renewed and others repaired.

There were used in renewals 15,250 tons of steel rails and 467,759 new ties. There are now 365.23 miles of steel track in use. There were 23.04 miles of new sidings laid and 10.67 miles of fence built. A large amount of ballasting was done.

There was added to the equipment 16 engines, 12 passenger cars, 694 box, 30 refrigerator, 250 stock, 250 flat, 100 ore and 24 coal cars.

More equipment is needed, and more steel rails and ballast to put the road in first-class order. Much has been done during the current year.

During the year the contract with the Southern Express Company was terminated, and the company began to do its own express business.

Harmonious relations were established with the Missouri, Kansas & Texas, doing away with the former competition on Texas business.

Control of the Memphis & Little Rock road was secured, removing an annoying competition on Arkansas business. An agreement for pro-rating on business by way of Memphis was concluded with the Louisville & Nashville.

Arrangements have been made to build a system of branches connecting the road with important points in Southern Arkansas and extending into North Louisiana.